FULL-LENGTH PRACTICE EXAM 2

Comprehensive Practice Exam 2

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 58-year-old man with a history of hypertension and tobacco use presents with substernal chest pressure occurring at rest for the past 2 hours. ECG reveals new T-wave inversions and ST depression in leads V1-V4. Troponin I is 2.8 ng/mL (elevated). He is hemodynamically stable with blood pressure 142/88 mmHg. Which of the following is the most likely diagnosis?

A. Stable angina pectoris

B. Acute pericarditis

C. Non-ST elevation myocardial infarction (NSTEMI)

D. Prinzmetal (variant) angina

2. A 74-year-old woman with a history of atrial fibrillation, hypertension, diabetes, and prior TIA presents to discuss long-term stroke prevention. Her CHA_2DS_2-VASc score is 6. She has normal renal and hepatic function. Which of the following is the most appropriate long-term anticoagulation strategy for stroke prevention?

A. Oral anticoagulation with a DOAC (apixaban, rivaroxaban, dabigatran, or edoxaban) or warfarin (INR 2.0-3.0)

B. Aspirin 81 mg daily alone

C. Aspirin plus clopidogrel (dual antiplatelet therapy)

D. No anticoagulation needed — risk is low

3. A 42-year-old man presents with progressive dyspnea on exertion and lower extremity edema. He has a history of heavy alcohol consumption (12-15 drinks daily for 15 years). Echocardiogram reveals four-chamber dilation with an ejection fraction of 20%, global hypokinesis, and moderate mitral and tricuspid regurgitation. There is no significant coronary artery disease on cardiac catheterization. Which of the following is the most likely diagnosis?

A. Hypertrophic cardiomyopathy

B. Ischemic cardiomyopathy

C. Restrictive cardiomyopathy

D. Alcoholic dilated cardiomyopathy

4. A 28-year-old woman presents with dyspnea on exertion, fatigue, and an episode of hemoptysis. She immigrated from Central America 5 years ago. Physical examination reveals a low-pitched diastolic rumbling murmur at the apex with an opening snap, loud S1, and a right ventricular heave. She is in atrial fibrillation. Echocardiogram reveals a valve area of 1.2 cm^2 with a mean gradient of 12 mmHg and a dilated left atrium. Which of the following is the most likely diagnosis?

A. Mitral regurgitation

B. Rheumatic mitral stenosis

C. Aortic stenosis

D. Tricuspid stenosis

5. A 65-year-old man with a mechanical aortic valve on warfarin presents to the ED after a syncopal episode. ECG reveals a heart rate of 42 bpm with a regularly irregular rhythm. Rhythm strip demonstrates progressive prolongation of the PR interval followed by a dropped QRS complex, after which the cycle repeats. Which of the following is the most likely diagnosis?

A. First-degree AV block

B. Third-degree (complete) AV block

C. Second-degree AV block, Mobitz Type I (Wenckebach)

D. Atrial fibrillation with slow ventricular response

6. A 72-year-old woman with hypertension, diabetes, and hyperlipidemia presents with a blood pressure of 168/96 mmHg on multiple readings. She is currently on amlodipine 10 mg daily and hydrochlorothiazide 25 mg daily. Her most recent basic metabolic panel shows creatinine 1.1 mg/dL, potassium 4.0 mEq/L, and urine albumin-to-creatinine ratio of 150 mg/g (elevated). Which of the following is the most appropriate medication to add to her regimen?

A. ACE inhibitor (lisinopril) or ARB (losartan) — provides blood pressure control plus nephroprotection for diabetic albuminuria

B. Beta-blocker (metoprolol)

C. Alpha-blocker (doxazosin)

D. Clonidine

7. A 35-year-old previously healthy man presents with acute onset of severe substernal chest pain and dyspnea 1 week after a viral upper respiratory infection. ECG reveals diffuse ST elevation. Troponin I is mildly elevated. Echocardiogram reveals global hypokinesis with an ejection fraction of 35% and a small pericardial effusion. Coronary angiography is normal. Cardiac MRI reveals patchy subepicardial late gadolinium enhancement. Which of the following is the most likely diagnosis?

A. Acute MI from coronary artery thrombosis

B. Acute myocarditis

C. Takotsubo (stress) cardiomyopathy

D. Acute pericarditis without myocardial involvement

8. A 60-year-old woman presents with progressive lower extremity swelling, fatigue, and abdominal distension over 3 months. Physical examination reveals markedly elevated JVP, hepatomegaly, ascites, and pitting edema bilaterally. There is no audible S3 or S4 and no murmurs. Echocardiogram reveals biatrial enlargement with normal-sized ventricles, normal wall thickness, and a preserved ejection fraction of 60%. Doppler shows restrictive filling pattern with elevated E/A ratio. The ventricular walls display a characteristic "sparkling" or "granular" appearance. Which of the following is the most likely diagnosis?

A. Dilated cardiomyopathy

B. Hypertrophic cardiomyopathy

C. Constrictive pericarditis

D. Cardiac amyloidosis (restrictive cardiomyopathy)

9. A 55-year-old man presents for evaluation of a systolic murmur. Physical examination reveals a harsh, crescendo-decrescendo systolic murmur at the left lower sternal border that increases in intensity with Valsalva maneuver and decreases with squatting. There is a bifid (spike-and-dome) carotid pulse. Echocardiogram confirms asymmetric septal hypertrophy with systolic anterior motion of the mitral valve and a resting LVOT gradient of 50 mmHg. Which of the following medications should be AVOIDED in this patient?

A. Metoprolol

B. Digoxin (increases contractility and worsens LVOT obstruction)

C. Verapamil

D. Disopyramide

10. A 52-year-old woman presents to the emergency department with severe hypertension (240/130 mmHg), headache, blurred vision, and confusion. Fundoscopic examination reveals papilledema, flame-shaped hemorrhages, and cotton-wool spots. Serum creatinine is acutely elevated at 3.2 mg/dL (baseline 1.0). Urinalysis reveals proteinuria and hematuria. Which of the following is the most appropriate initial management?

A. IV nicardipine or nitroprusside infusion to gradually reduce MAP by 20-25% in the first hour (hypertensive emergency with end-organ damage)

B. Oral lisinopril and outpatient follow-up

C. Immediate reduction of BP to normal (120/80) within 30 minutes

D. Observation and recheck in 24 hours

11. A 45-year-old man presents with palpitations and is found to have an irregularly irregular rhythm at 148 bpm. ECG reveals no discernible P waves, an irregularly irregular narrow-complex QRS at 148 bpm, and a fibrillatory baseline. He reports onset approximately 18 hours ago. He has no prior history of arrhythmia. Echocardiogram reveals normal LV function and no valvular disease. He is hemodynamically stable. Which of the following is the most appropriate approach regarding rhythm control?

A. Cardioversion is absolutely contraindicated at this time

B. Anticoagulate for 3 weeks first, then attempt cardioversion

C. Pharmacologic or electrical cardioversion can be considered now if TEE-guided approach excludes left atrial thrombus OR if onset is confirmed within 48 hours with therapeutic anticoagulation initiated

D. Permanent pacemaker placement

12. A 68-year-old man with a history of coronary artery disease, prior MI, and EF of 30% presents for evaluation of recurrent sustained ventricular tachycardia. He is currently on optimal medical therapy including a beta-blocker, ACE inhibitor, and amiodarone. He had two episodes of sustained VT in the past month requiring ED visits. Which of the following is the most appropriate next step for secondary prevention of sudden cardiac death?

A. Increase amiodarone dose

B. Add lidocaine orally

C. Catheter ablation alone without device therapy

D. Implantable cardioverter-defibrillator (ICD) placement

13. A 40-year-old woman presents with progressive dyspnea and fatigue. She has a history of fenfluramine-phentermine (fen-phen) diet pill use in the 1990s. Physical examination reveals a loud P2 component of S2, right ventricular heave, and peripheral edema. ECG shows right axis deviation and right ventricular hypertrophy. Right heart catheterization reveals mean pulmonary artery pressure of 48 mmHg (normal less than 20). Which of the following is the most likely diagnosis?

A. Left-sided heart failure

B. Pulmonary arterial hypertension (PAH)

C. Chronic thromboembolic pulmonary hypertension

D. Mitral stenosis

14. A 78-year-old man presents after a syncopal episode while walking. His wife reports he has been increasingly short of breath with exertion. Physical examination reveals a slow-rising carotid pulse, a late-peaking (Grade IV/VI) crescendo-decrescendo systolic murmur at the right upper sternal border radiating to the carotids, and a single S2 (absent A2). Echocardiogram reveals a heavily calcified bicuspid aortic valve with a valve area of 0.6 cm^2 and mean gradient of 58 mmHg. EF is 55%. He has significant comorbidities including severe COPD and CKD. Which of the following is the most appropriate treatment?

A. Transcatheter aortic valve replacement (TAVR) — preferred for patients at high surgical risk with severe symptomatic aortic stenosis

B. Medical management with diuretics and vasodilators

C. Balloon aortic valvuloplasty as definitive treatment

D. Watchful waiting

15. A 62-year-old man with longstanding uncontrolled hypertension presents with exertional dyspnea. Echocardiogram reveals concentric left ventricular hypertrophy (wall thickness 14 mm), impaired relaxation pattern on mitral inflow Doppler, grade II diastolic dysfunction, and an ejection fraction of 62%. He has bilateral lower extremity edema, elevated BNP, and bibasilar crackles. Which of the following is the most likely diagnosis?

A. Aortic stenosis

B. Hypertrophic cardiomyopathy

C. Heart failure with preserved ejection fraction (HFpEF — diastolic heart failure)

D. Dilated cardiomyopathy

16. A 22-year-old man collapses during a basketball game and is found pulseless. AED analysis reveals ventricular fibrillation. Successful defibrillation restores sinus rhythm. ECG reveals a short PR interval (less than 120 ms) and a delta wave (slurred upstroke of the QRS complex) with a widened QRS. Echocardiogram is normal. Which of the following is the most likely underlying diagnosis?

A. Long QT syndrome

B. Brugada syndrome

C. Hypertrophic cardiomyopathy

D. Wolff-Parkinson-White (WPW) syndrome

SECTION 2: PULMONARY (12 Questions)

17. A 50-year-old woman presents with progressive dyspnea and cough. She has a 15-year history of rheumatoid arthritis. High-resolution CT reveals bilateral ground-glass opacities with a mosaic attenuation pattern and areas of traction bronchiectasis. She has been on methotrexate for 10 years. Pulmonary function testing reveals a restrictive pattern with reduced DLCO. Which of the following is the most likely etiology of her pulmonary findings?

A. COPD from tobacco use

B. Interstitial lung disease (either RA-associated ILD or methotrexate-induced pneumonitis)

C. Pulmonary embolism

D. Lung cancer

18. A 45-year-old woman presents with episodic wheezing, cough, and chest tightness occurring 3-4 times per week with nocturnal awakenings twice monthly. She uses her albuterol rescue inhaler 3 times weekly. FEV1 is 82% predicted with 14% reversibility after bronchodilator. She is currently on no controller medication. Which of the following best classifies her asthma severity and indicates appropriate initial controller therapy?

A. Mild persistent asthma — initiate low-dose inhaled corticosteroid (ICS)

B. Moderate persistent asthma — initiate medium-dose ICS plus LABA

C. Severe persistent asthma — initiate high-dose ICS plus LABA plus oral prednisone

D. Intermittent asthma — rescue inhaler only, no controller needed

19. A 65-year-old man with a 50-pack-year smoking history presents with a 3-centimeter solitary pulmonary nodule (SPN) discovered on chest CT. The nodule has irregular, spiculated borders and is PET-avid with a high SUV. Comparison with a CT from 1 year ago shows the nodule has increased from 1.5 cm to 3 cm. He has no prior history of malignancy. Which of the following is the most appropriate next step?

A. Repeat CT in 3 months for surveillance

B. Prescribe antibiotics for possible infection

C. Annual low-dose CT screening only

D. Tissue biopsy (CT-guided percutaneous biopsy or bronchoscopy) followed by staging if malignant

20. A 72-year-old nursing home resident presents with fever, foul-smelling productive cough, and a chest X-ray revealing a right lower lobe infiltrate with an air-fluid level (lung abscess) in a dependent segment. The patient has a history of dysphagia from a prior stroke and witnessed episodes of choking during meals. Which of the following is the most likely mechanism of this infection?

A. Hematogenous spread from endocarditis

B. Inhalation of environmental fungi

C. Aspiration of oropharyngeal secretions containing anaerobic bacteria

D. Reactivation of latent tuberculosis

21. A 38-year-old man presents with sudden onset right-sided pleuritic chest pain and dyspnea. He has a history of cystic fibrosis with severe bronchiectasis. Chest X-ray reveals a right-sided pneumothorax (approximately 40%) with underlying parenchymal abnormalities bilaterally. This is his third right-sided pneumothorax. Which of the following is the most appropriate definitive management?

A. Observation with supplemental oxygen

B. Video-assisted thoracoscopic surgery (VATS) with pleurodesis — recommended for recurrent secondary spontaneous pneumothorax

C. Needle aspiration alone

D. Chest tube placement alone without pleurodesis

22. A 55-year-old man presents with progressive exertional dyspnea and dry cough over 6 months. He works in a shipyard and has a 30-year history of asbestos exposure. Chest CT reveals bilateral pleural plaques, a diffuse reticular pattern predominantly in the lower lobes, and honeycombing. Pulmonary function testing reveals a restrictive pattern with reduced DLCO. Which of the following is the most likely diagnosis?

A. Silicosis

B. Berylliosis

C. Coal workers' pneumoconiosis

D. Asbestosis with asbestos-related pleural disease

23. A 30-year-old man is admitted to the ICU with severe sepsis from pneumonia. Despite IV antibiotics and fluid resuscitation, he develops progressive hypoxemia with bilateral diffuse pulmonary infiltrates on chest X-ray. PaO2/FiO2 ratio is 120 (normal greater than 300). Pulmonary capillary wedge pressure is 14 mmHg (normal, excluding cardiogenic pulmonary edema). Which of the following is the most likely diagnosis?

A. Acute respiratory distress syndrome (ARDS)

B. Cardiogenic pulmonary edema

C. Bilateral pneumonia only

D. Pulmonary hemorrhage

24. A 50-year-old woman with a history of breast cancer (treated with radiation 10 years ago) presents with progressive dyspnea, dry cough, and chest CT showing upper lobe-predominant reticular opacities and volume loss. PFTs show a restrictive pattern. No evidence of cancer recurrence on imaging. Which of the following is the most likely diagnosis?

A. Lung metastases

B. Lymphangitic carcinomatosis

C. Radiation-induced pulmonary fibrosis

D. Sarcoidosis

25. A 40-year-old obese woman (BMI 45) is evaluated for dyspnea, daytime somnolence, and lower extremity edema. ABG reveals pH 7.32, PaCO2 58 mmHg, PaO2 55 mmHg, and HCO3 34 mEq/L on room air. Polysomnography reveals severe OSA (AHI 52). Echocardiogram reveals right ventricular dilation and elevated estimated pulmonary artery systolic pressure. Which of the following is the most likely unifying diagnosis?

A. Congestive heart failure

B. COPD

C. Primary pulmonary arterial hypertension

D. Obesity hypoventilation syndrome (OHS, Pickwickian syndrome) with cor pulmonale

26. A 60-year-old man with a history of squamous cell lung cancer (treated with chemotherapy) presents with progressive dyspnea. Chest X-ray reveals a large left pleural effusion. Thoracentesis yields 1,500 mL of bloody fluid. Pleural fluid analysis reveals pH 7.20, LDH 850 U/L (serum LDH 250), protein 5.2 g/dL (serum protein 7.0), glucose 35 mg/dL, and cytology positive for malignant squamous cells. Which of the following best classifies this pleural effusion?

A. Transudative effusion from heart failure

B. Exudative malignant pleural effusion (meets Light's criteria: pleural/serum LDH ratio greater than 0.6, pleural/serum protein ratio greater than 0.5, pleural LDH greater than 2/3 upper limit of normal)

C. Parapneumonic effusion

D. Hemothorax from trauma

27. A 48-year-old man with HIV (CD4 count 150 cells/μL, not on ART) presents with 3 weeks of fever, night sweats, weight loss, and productive cough. Chest X-ray reveals bilateral upper lobe cavitary infiltrates with mediastinal lymphadenopathy. Three sputum samples are positive for acid-fast bacilli on smear. Which of the following is the most critical initial public health intervention alongside initiating treatment?

A. Immediate surgical resection of the cavitary lesion

B. Prophylactic isoniazid for all household contacts

C. Refer to dermatology for skin biopsy

D. Airborne isolation (negative pressure room), contact tracing, and reporting to the health department

28. A 26-year-old woman with a history of allergic rhinitis, nasal polyps, and asthma presents with worsening asthma symptoms, fever, migratory pulmonary infiltrates on chest X-ray, and peripheral eosinophilia (18%). She also reports new-onset numbness and tingling in her feet (mononeuritis multiplex). p-ANCA (anti-MPO) is positive. Skin biopsy reveals eosinophilic granulomatous vasculitis. Which of the following is the most likely diagnosis?

A. Eosinophilic granulomatosis with polyangiitis (EGPA, formerly Churg-Strauss syndrome)

B. Granulomatosis with polyangiitis (GPA, formerly Wegener)

C. Allergic bronchopulmonary aspergillosis (ABPA)

D. Chronic eosinophilic pneumonia

SECTION 3: GASTROINTESTINAL/NUTRITIONAL (10 Questions)

29. A 45-year-old man with a long history of GERD presents with progressive dysphagia for solids. EGD reveals salmon-colored, velvety mucosa extending 5 cm above the gastroesophageal junction replacing the normal pale squamous epithelium. Biopsies confirm intestinal metaplasia with goblet cells. No dysplasia is identified. Which of the following is the most likely diagnosis?

A. Esophageal adenocarcinoma

B. Eosinophilic esophagitis

C. Barrett esophagus without dysplasia

D. Esophageal squamous cell carcinoma

30. A 35-year-old man presents with progressive dysphagia for both solids and liquids, regurgitation of undigested food, and a 15-pound weight loss. Barium swallow reveals a dilated esophagus with a smooth, tapered "bird's beak" narrowing at the gastroesophageal junction. Esophageal manometry reveals absent peristalsis in the esophageal body and incomplete relaxation of the lower esophageal sphincter with elevated resting LES pressure. Which of the following is the most likely diagnosis?

A. Esophageal stricture from chronic GERD

B. Achalasia

C. Diffuse esophageal spasm

D. Esophageal carcinoma

31. A 55-year-old man presents with acute onset of painless, massive lower GI bleeding (bright red blood per rectum with hemodynamic instability). He has no prior history of GI bleeding. After initial resuscitation with IV fluids and blood products, colonoscopy reveals active bleeding from a vessel in the right colon (cecum) without surrounding inflammation or diverticulum. Which of the following is the most likely source of bleeding?

A. Internal hemorrhoids

B. Colorectal carcinoma

C. Diverticulosis

D. Arteriovenous malformation (angiodysplasia)

32. A 48-year-old woman presents with episodic right upper quadrant pain lasting 30-60 minutes, triggered by fatty meals, associated with nausea but without fever or jaundice. Between episodes she is completely asymptomatic. Labs including WBC, liver enzymes, and bilirubin are normal. RUQ ultrasound reveals multiple gallstones with a normal gallbladder wall (2 mm), no pericholecystic fluid, and a normal common bile duct (4 mm). Which of the following is the most likely diagnosis?

A. Symptomatic cholelithiasis (biliary colic)

B. Acute cholecystitis

C. Choledocholithiasis

D. Biliary dyskinesia

33. A 60-year-old man with a history of cirrhosis (Child-Pugh B) presents with increasing abdominal distension. He is afebrile. Paracentesis yields clear yellow fluid with an albumin of 0.8 g/dL (serum albumin 3.0 g/dL), giving a serum-ascites albumin gradient (SAAG) of 2.2. Ascitic fluid WBC is 180 cells/μL with 15% PMNs. Cultures are negative. Which of the following is the most likely cause of his ascites?

A. Peritoneal carcinomatosis

B. Tuberculosis peritonitis

C. Portal hypertension from cirrhosis (high SAAG $\geq$ 1.1 indicates portal hypertension)

D. Nephrotic syndrome

34. A 28-year-old man presents with recurrent episodes of crampy right lower quadrant abdominal pain, non-bloody diarrhea, weight loss, and perianal fistula. Colonoscopy reveals skip lesions with deep linear ulcers creating a "cobblestone" appearance in the terminal ileum and ascending colon, with normal-appearing rectum and sigmoid. Biopsies reveal transmural inflammation with non-caseating granulomas. Which of the following is the most likely diagnosis?

A. Ulcerative colitis

B. Crohn disease

C. Intestinal tuberculosis

D. Behcet disease

35. A 65-year-old woman presents with painless jaundice, dark urine, clay-colored stools, a 20-pound weight loss, and a palpable, non-tender gallbladder (Courvoisier sign). CT reveals a hypodense mass in the head of the pancreas with dilation of both the common bile duct and the main pancreatic duct ("double duct sign"). CA 19-9 is markedly elevated. Which of the following is the most likely diagnosis?

A. Chronic pancreatitis

B. Cholangiocarcinoma

C. Acute cholecystitis with choledocholithiasis

D. Pancreatic adenocarcinoma (head of pancreas)

36. A 50-year-old woman with a history of alcohol use disorder and known cirrhosis presents with fever (101.8°F), diffuse abdominal pain, and worsening ascites. Paracentesis reveals cloudy ascitic fluid with WBC 650 cells/μL with 78% PMNs (absolute PMN count 507 cells/μL). Gram stain is negative. Ascitic fluid culture is pending. Which of the following is the most appropriate initial treatment?

A. IV cefotaxime (third-generation cephalosporin) empirically — absolute PMN count ≥250 cells/μL confirms spontaneous bacterial peritonitis (SBP) regardless of culture results

B. Observation until culture results return

C. Surgical exploration for secondary peritonitis

D. Oral TMP-SMX

37. A 32-year-old woman presents with intermittent abdominal pain, bloating, alternating diarrhea and constipation, and abdominal discomfort relieved by defecation. Symptoms have been present for over 1 year. She has no weight loss, rectal bleeding, nocturnal symptoms, fever, or family history of GI malignancy. CBC, CMP, CRP, ESR, celiac serologies, and stool calprotectin are all normal. Colonoscopy (performed due to patient anxiety) is normal. Which of the following is the most likely diagnosis?

A. Inflammatory bowel disease

B. Celiac disease

C. Irritable bowel syndrome (IBS) — meets Rome IV criteria

D. Microscopic colitis

38. A 55-year-old man with a history of hepatitis C cirrhosis undergoes surveillance ultrasound, which reveals a new 3-centimeter hyperechoic lesion in the right hepatic lobe. AFP is 450 ng/mL (markedly elevated). Triple-phase contrast CT reveals arterial-phase hyperenhancement with venous-phase washout. He has Child-Pugh A cirrhosis with no portal vein thrombosis. Which of the following is the most likely diagnosis?

A. Hepatic hemangioma

B. Focal nodular hyperplasia

C. Metastatic colorectal cancer

D. Hepatocellular carcinoma (HCC)

SECTION 4: MUSCULOSKELETAL (10 Questions)

39. A 60-year-old woman presents with bilateral shoulder and hip girdle pain and stiffness. Morning stiffness lasts 2 hours. She reports profound fatigue and mild weight loss. ESR is 85 mm/hr and CRP is markedly elevated. Physical examination reveals limited active range of motion of both shoulders and hips from pain, but full passive range of motion. Muscle strength is normal. There is no joint swelling. CK is normal. Which of the following is the most likely diagnosis?

A. Rheumatoid arthritis

B. Polymyalgia rheumatica (PMR)

C. Fibromyalgia

D. Polymyositis

40. A 45-year-old woman presents with proximal muscle weakness (difficulty rising from a chair, climbing stairs, and lifting objects overhead), a violaceous (heliotrope) rash on the upper eyelids, and erythematous papules over the MCP and PIP joints (Gottron papules). CK is 4,500 U/L (markedly elevated). EMG reveals myopathic changes. MRI of the thighs reveals symmetric muscle edema. She also has a new persistent cough and chest imaging reveals a pulmonary mass. Which of the following is the most likely diagnosis?

A. Dermatomyositis — with associated malignancy screening indicated

B. Polymyositis

C. Inclusion body myositis

D. Systemic lupus erythematosus

41. A 30-year-old man presents with right knee swelling 3 weeks after an episode of Chlamydia trachomatis urethritis. He also has painful red eyes (conjunctivitis) and painless ulcers on his palms and soles (keratoderma blennorrhagicum). He is HLA-B27 positive. Joint aspiration reveals inflammatory fluid (WBC 18,000 with 70% PMNs) but no crystals and negative Gram stain and culture. Which of the following is the most likely diagnosis?

A. Septic arthritis

B. Gout

C. Reactive arthritis (formerly Reiter syndrome)

D. Gonococcal arthritis

42. A 16-year-old female dancer presents with anterior knee pain that worsens with squatting, climbing stairs, and prolonged sitting ("theater sign"). Physical examination reveals no effusion, no joint instability, no tenderness along the joint line, but pain with compression of the patella against the femoral groove (patellar grind test) and tenderness along the medial patellar facet. Which of the following is the most likely diagnosis?

A. Anterior cruciate ligament tear

B. Meniscal tear

C. Osgood-Schlatter disease

D. Patellofemoral pain syndrome (chondromalacia patellae)

43. A 65-year-old woman presents with sudden onset of severe low back pain after lifting a heavy box. She has a history of osteoporosis (T-score -3.2). Physical examination reveals point tenderness over the T12 spinous process. There are no neurologic deficits. X-ray reveals a 40% compression fracture of T12 with no retropulsion into the spinal canal. Which of the following is the most appropriate initial management?

A. Pain management (analgesics, bracing), activity modification, and osteoporosis treatment (bisphosphonate therapy) — conservative management is first-line for stable osteoporotic compression fractures

B. Emergent surgical spinal fusion

C. Bed rest for 6 weeks

D. No treatment needed for compression fractures

44. A 42-year-old construction worker presents with low back pain radiating down the posterior left leg to the lateral foot and small toes. Pain worsens with sitting and bending forward and improves with lying down. Physical examination reveals positive straight leg raise at 35 degrees on the left, decreased ankle jerk (S1 reflex), weakness of left foot plantarflexion, and decreased sensation over the lateral foot. Which of the following is the most likely diagnosis?

A. L3-L4 disc herniation affecting the L4 nerve root

B. L5-S1 disc herniation affecting the S1 nerve root

C. Lumbar spinal stenosis

D. Piriformis syndrome

45. A 55-year-old woman with a 20-year history of seropositive rheumatoid arthritis presents with neck pain and electrical shock sensations radiating down her spine with neck flexion (Lhermitte sign). She reports progressive hand weakness and unsteady gait. MRI of the cervical spine reveals atlantoaxial (C1-C2) subluxation with the odontoid process compressing the spinal cord. Which of the following is the most significant concern?

A. Cervical radiculopathy only

B. Rotator cuff tear

C. Peripheral neuropathy

D. Cervical myelopathy from atlantoaxial instability — risk of spinal cord compression requiring surgical stabilization

46. A 12-year-old boy presents with a 3-month history of right knee pain that worsens with activity. Physical examination reveals a firm, non-tender mass on the proximal tibia. X-ray reveals a mixed lytic-sclerotic lesion in the proximal tibial metaphysis with a sunburst periosteal reaction and Codman triangle. Serum alkaline phosphatase is elevated. Which of the following is the most likely diagnosis?

A. Ewing sarcoma

B. Giant cell tumor

C. Osteosarcoma

D. Osteochondroma

47. A 50-year-old woman with systemic lupus erythematosus on chronic corticosteroids presents with progressive bilateral hip pain, worse with weight bearing. She has no history of trauma. X-ray reveals bilateral crescent signs in the femoral heads with subchondral collapse. MRI confirms bilateral femoral head osteonecrosis. Which of the following is the most significant risk factor for her condition?

A. Chronic corticosteroid use (the most common cause of non-traumatic osteonecrosis)

B. Systemic lupus erythematosus itself

C. Age over 50

D. Female sex

48. A 25-year-old man presents with chronic bilateral sacroiliac joint pain and low back stiffness that improves with exercise. He also has a red, painful left eye (anterior uveitis). X-ray reveals bilateral sacroiliitis with sclerosis. HLA-B27 is positive. He has already been started on NSAIDs with partial response. Which of the following is the most appropriate next-line therapy?

A. Oral methotrexate

B. Biologic therapy — TNF inhibitor (adalimumab, etanercept, infliximab) or IL-17 inhibitor (secukinumab)

C. Oral prednisone

D. Oral sulfasalazine

SECTION 5: HEMATOLOGY (6 Questions)

49. A 60-year-old man presents with fatigue, early satiety, and splenomegaly on examination. CBC reveals WBC 85,000/µL with a left shift showing the entire spectrum of myeloid maturation (myelocytes, metamyelocytes, bands, segmented neutrophils), basophilia, and a mild anemia. Peripheral smear shows no blasts. Bone marrow biopsy reveals hypercellularity with marked granulocytic proliferation. BCR-ABL fusion gene (Philadelphia chromosome) is detected by FISH. Which of the following is the most likely diagnosis?

A. Acute myeloid leukemia

B. Chronic lymphocytic leukemia

C. Myelodysplastic syndrome

D. Chronic myeloid leukemia (CML)

50. A 70-year-old man presents with fatigue and is found to have a WBC of 65,000/µL with 90% mature-appearing small lymphocytes on peripheral smear. He has painless bilateral cervical, axillary, and inguinal lymphadenopathy and splenomegaly. Flow cytometry reveals CD5+, CD19+, CD20 dim, CD23+ B lymphocytes. Peripheral smear reveals numerous "smudge cells." He is asymptomatic aside from fatigue. Which of the following is the most likely diagnosis?

A. Acute lymphoblastic leukemia

B. Hairy cell leukemia

C. Chronic lymphocytic leukemia (CLL)

D. Mantle cell lymphoma

51. A 22-year-old man presents with a painless, rubbery 4-centimeter left supraclavicular lymph node. He also reports fevers, drenching night sweats, and a 15-pound weight loss over 2 months. CT reveals mediastinal lymphadenopathy. Lymph node biopsy reveals Reed-Sternberg cells (large, bilobed, "owl-eye" nuclei) in a background of reactive lymphocytes, eosinophils, and histiocytes. CD15 and CD30 are positive on immunohistochemistry. Which of the following is the most likely diagnosis?

A. Non-Hodgkin lymphoma (diffuse large B-cell)

B. Sarcoidosis

C. Reactive lymphadenopathy

D. Hodgkin lymphoma (classical type)

52. A 35-year-old woman presents with fatigue, jaundice, and dark urine. CBC reveals hemoglobin 7.5 g/dL with reticulocyte count of 12% (elevated). Peripheral smear reveals spherocytes and polychromasia. LDH is elevated, haptoglobin is undetectable, and indirect bilirubin is elevated. Direct Coombs test (DAT) is positive for IgG. She has no history of transfusion or medication changes. She has a history of systemic lupus erythematosus. Which of the following is the most likely diagnosis?

A. Warm autoimmune hemolytic anemia (AIHA) — associated with SLE, positive DAT for IgG

B. Cold agglutinin disease

C. Hereditary spherocytosis

D. Thrombotic thrombocytopenic purpura

53. A 30-year-old woman presents with fatigue, recurrent infections, and easy bruising. CBC reveals WBC 1,800/μL, hemoglobin 8.0 g/dL, and platelets 22,000/μL (pancytopenia). Reticulocyte count is 0.2% (inappropriately low). Peripheral smear reveals no abnormal cells. Bone marrow biopsy reveals a markedly hypocellular marrow (less than 10% cellularity) with fat replacing hematopoietic tissue and no fibrosis or malignant infiltrate. Which of the following is the most likely diagnosis?

A. Myelodysplastic syndrome

B. Acute leukemia

C. Aplastic anemia

D. Myelofibrosis

54. A 45-year-old man presents with recurrent epistaxis, easy bruising, and prolonged bleeding after dental procedures. CBC reveals a normal platelet count and normal platelet morphology. PT is normal. PTT is mildly prolonged. Bleeding time is prolonged. Ristocetin cofactor activity is decreased. Factor VIII activity is mildly decreased. Ristocetin-induced platelet aggregation is decreased. Which of the following is the most likely diagnosis?

A. Hemophilia A

B. Von Willebrand disease (most common inherited bleeding disorder)

C. Bernard-Soulier syndrome

D. Hemophilia B

SECTION 6: ENDOCRINE (6 Questions)

55. A 35-year-old woman presents with anterior neck pain and tenderness radiating to the jaw, fever, and malaise following a viral upper respiratory infection 2 weeks ago. The thyroid is diffusely tender and firm. TSH is suppressed (0.1 mIU/L) and free T4 is elevated. ESR is 65 mm/hr. Radioactive iodine uptake is very low (less than 5%). Fine needle aspiration reveals granulomatous inflammation with multinucleated giant cells. Which of the following is the most likely diagnosis?

A. Graves disease

B. Hashimoto thyroiditis

C. Toxic multinodular goiter

D. Subacute (De Quervain) thyroiditis

56. A 40-year-old woman presents with a 2-centimeter solitary thyroid nodule discovered on routine examination. She has no compressive symptoms. TSH is normal. Ultrasound reveals a solid, hypoechoic nodule with irregular margins, microcalcifications, and taller-than-wide shape. There are no suspicious cervical lymph nodes. Which of the following is the most appropriate next step?

A. Fine needle aspiration biopsy (FNA) — nodule has multiple high-suspicion ultrasound features warranting tissue diagnosis

B. Radioactive iodine uptake scan first

C. Immediate thyroidectomy without tissue diagnosis

D. Observation with repeat ultrasound in 1 year

57. A 55-year-old man is brought to the emergency department with confusion, dehydration, blood glucose of 680 mg/dL, serum sodium 128 mEq/L (corrected 138), serum osmolality 340 mOsm/kg (elevated), and pH 7.36 with no ketonuria. He has a history of type 2 diabetes and stopped taking his medications 1 week ago due to a urinary tract infection. Which of the following is the most likely diagnosis?

A. Diabetic ketoacidosis (DKA)

B. Hypoglycemic encephalopathy

C. Hyperosmolar hyperglycemic state (HHS)

D. Lactic acidosis

58. A 30-year-old woman presents with episodic headaches, palpitations, weight loss, and heat intolerance. Examination reveals a 3-centimeter thyroid nodule. TSH is suppressed. Thyroid ultrasound reveals a solid, well-circumscribed nodule. Radioactive iodine uptake scan reveals a single "hot" nodule (increased uptake) with suppressed uptake in the surrounding thyroid tissue. Which of the following is the most likely diagnosis?

A. Thyroid cancer

B. Toxic adenoma (autonomously functioning thyroid nodule)

C. Graves disease

D. Subacute thyroiditis

59. A 48-year-old woman presents with hypertension refractory to three medications, hypokalemia (K+ 2.9 mEq/L), metabolic alkalosis, and muscle weakness. Plasma aldosterone concentration is 28 ng/dL (elevated) with a suppressed plasma renin activity (PRA), yielding an aldosterone-to-renin ratio greater than 30. CT of the adrenals reveals a 2-centimeter left adrenal adenoma. Which of the following is the most likely diagnosis?

A. Primary hyperaldosteronism (Conn syndrome)

B. Secondary hyperaldosteronism

C. Cushing syndrome

D. Pheochromocytoma

60. A 62-year-old woman is found to have a serum calcium of 6.5 mg/dL on routine blood work following total thyroidectomy 2 days ago. She reports perioral numbness, tingling in her fingertips, and muscle cramping. Physical examination reveals a positive Chvostek sign (facial muscle twitching with tapping of the facial nerve) and positive Trousseau sign (carpopedal spasm with blood pressure cuff inflation). PTH is less than 5 pg/mL (inappropriately low). Phosphorus is 6.2 mg/dL (elevated). Which of the following is the most likely diagnosis?

A. Primary hyperparathyroidism

B. Vitamin D deficiency

C. Pseudohypoparathyroidism

D. Surgical hypoparathyroidism (iatrogenic — inadvertent removal or devascularization of parathyroid glands during thyroidectomy)

SECTION 7: NEUROLOGY (6 Questions)

61. A 75-year-old man presents with sudden onset of right-sided weakness, sensory loss, and homonymous hemianopia. He was last seen normal 8 hours ago. CT head without contrast is negative for hemorrhage. CT angiography reveals complete occlusion of the left middle cerebral artery (M1 segment). MRI DWI reveals a large area of restricted diffusion in the left MCA territory with a significant penumbra on perfusion imaging. Which of the following is the most appropriate treatment approach?

A. IV tPA only (outside 4.5-hour window for IV thrombolysis)

B. Mechanical thrombectomy (endovascular intervention can be performed up to 24 hours in select patients with favorable perfusion imaging)

C. Aspirin and observation

D. Heparin anticoagulation

62. A 55-year-old woman presents with a severe unilateral headache, scalp tenderness over the right temporal region (cannot brush her hair), jaw claudication while eating, and visual blurring in the right eye. ESR is 95 mm/hr and CRP is markedly elevated. Temporal artery biopsy reveals granulomatous inflammation with multinucleated giant cells and fragmentation of the internal elastic lamina. Which of the following is the most appropriate treatment?

A. High-dose corticosteroids (prednisone 40-60 mg daily) initiated immediately — do NOT wait for biopsy results to prevent irreversible vision loss

B. Methotrexate alone

C. NSAIDs

D. Observation with serial ESR monitoring

63. A 70-year-old man presents with progressive gait difficulty, urinary incontinence, and cognitive decline over 6 months. His gait is wide-based, slow, and magnetic (feet appear to stick to the floor). CT of the head reveals ventriculomegaly out of proportion to sulcal atrophy. Lumbar puncture with removal of 30 mL of CSF results in temporary gait improvement. Which of the following is the most likely diagnosis?

A. Alzheimer disease

B. Parkinson disease

C. Lewy body dementia

D. Normal pressure hydrocephalus (NPH)

64. A 28-year-old woman presents with a generalized tonic-clonic seizure witnessed by her roommate. She had a second seizure in the ED. She has no prior seizure history, no head trauma, no substance use, and no family history of epilepsy. MRI brain is normal. EEG shows generalized 3-Hz spike-and-wave discharges. She is started on an antiepileptic drug and counseled about epilepsy. She asks about driving restrictions. Which of the following is the most appropriate first-line medication?

A. Carbamazepine

B. Phenytoin

C. Valproic acid or lamotrigine (first-line for generalized epilepsy; lamotrigine preferred in women of childbearing age due to lower teratogenic risk)

D. Gabapentin

65. A 60-year-old man presents with progressive bilateral lower extremity weakness, ascending numbness, and areflexia over 5 days following a diarrheal illness (Campylobacter jejuni). He now has difficulty walking and reports tingling in his hands. Nerve conduction studies reveal prolonged distal latencies, conduction block, and reduced conduction velocities consistent with demyelination. CSF reveals albuminocytologic dissociation (elevated protein with normal cell count). Which of the following is the most likely diagnosis?

A. Guillain-Barré syndrome (acute inflammatory demyelinating polyradiculoneuropathy — AIDP)

B. Myasthenia gravis

C. Transverse myelitis

D. Amyotrophic lateral sclerosis

66. A 30-year-old woman presents with fluctuating ptosis, diplopia, and generalized fatigable weakness that worsens as the day progresses and with repeated use. She has difficulty chewing after prolonged meals. Physical examination reveals bilateral ptosis that worsens with sustained upgaze, weak neck flexion, and proximal limb weakness. Edrophonium (Tensilon) test results in transient improvement of ptosis and strength. Anti-acetylcholine receptor antibodies are positive. CT chest reveals an anterior mediastinal mass. Which of the following is the most likely diagnosis?

A. Lambert-Eaton myasthenic syndrome

B. Myasthenia gravis with thymoma

C. Botulism

D. Polymyositis

SECTION 8: PSYCHIATRY/BEHAVIORAL HEALTH (6 Questions)

67. A 45-year-old man presents with a 2-year history of excessive worry about multiple life domains (work, finances, family health) that he finds difficult to control. He reports muscle tension, sleep disturbance, irritability, difficulty concentrating, and fatigue. Symptoms are present most days and cause significant occupational impairment. He has no panic attacks, obsessive thoughts, or trauma history. Physical examination and laboratory studies are normal. Which of the following is the most likely diagnosis?

A. Panic disorder

B. Social anxiety disorder

C. Adjustment disorder with anxiety

D. Generalized anxiety disorder (GAD)

68. A 19-year-old college student presents with his parents who report bizarre behavior over the past week. He has been sleeping only 2 hours per night, talking rapidly about grandiose plans to "save the world," spending excessively, and engaging in risky behavior. He has no prior psychiatric history. Urine drug screen is positive for amphetamines. He reports using his roommate's Adderall to help him study for exams. Which of the following is the most important initial consideration?

A. Diagnose bipolar I disorder and start lithium

B. Diagnose brief psychotic disorder

C. Rule out substance-induced mood disorder before diagnosing a primary mood disorder — amphetamine use can cause manic-like symptoms

D. Start antipsychotic medication immediately

69. A 35-year-old woman presents with recurrent, intrusive thoughts about contamination (obsessions) that cause her significant anxiety. She spends 3-4 hours daily performing hand-washing rituals (compulsions) to reduce her anxiety, resulting in raw, cracked skin on her hands. She recognizes the thoughts are excessive but cannot stop the behavior. The symptoms significantly impair her daily functioning and relationships. Which of the following is the most likely diagnosis?

A. Obsessive-compulsive disorder (OCD)

B. Generalized anxiety disorder

C. Illness anxiety disorder (hypochondriasis)

D. Body dysmorphic disorder

70. A 70-year-old man with Parkinson disease develops visual hallucinations (seeing children playing in his room), fluctuating cognition (alert some days, confused on others), and worsening parkinsonian features. He has REM sleep behavior disorder. His family reports his cognitive symptoms began before or concurrent with his motor symptoms. MMSE is 22/30. CT head is unremarkable. Which of the following is the most likely diagnosis?

A. Alzheimer disease

B. Dementia with Lewy bodies

C. Parkinson disease dementia

D. Vascular dementia

71. A 28-year-old woman presents with a pattern of intense, unstable interpersonal relationships alternating between idealization and devaluation, chronic feelings of emptiness, impulsive behavior (binge eating, reckless driving), recurrent suicidal gestures (superficial wrist cutting), and intense fear of abandonment. She has identity disturbance with an unstable self-image. She reports these patterns have been present since late adolescence. Which of the following is the most likely diagnosis?

A. Bipolar II disorder

B. Histrionic personality disorder

C. Borderline personality disorder

D. Major depressive disorder with anxious features

72. A 78-year-old man is brought to the ED by his daughter who reports acute onset of confusion, agitation, and visual hallucinations over the past 24 hours. He was oriented and functioning independently 2 days ago. He recently started a new medication (oxybutynin for overactive bladder). He has fluctuating level of consciousness — drowsy one hour, agitated the next. Physical examination reveals dry mucous membranes, tachycardia, urinary retention, and dilated pupils. Which of the following is the most likely diagnosis?

A. Alzheimer disease

B. Sundowning in dementia

C. Acute psychotic episode (schizophrenia)

D. Delirium (acute confusional state — likely anticholinergic toxicity from oxybutynin)

SECTION 9: RENAL/UROGENITAL (6 Questions)

73. A 55-year-old man with a history of diabetes presents with bilateral lower extremity edema, foamy urine, and a 20-pound weight gain. Laboratory studies reveal serum albumin 2.0 g/dL, total cholesterol 380 mg/dL, and 24-hour urine protein of 8.5 g (nephrotic range). Serum creatinine is 1.2 mg/dL (mildly elevated). ANA, hepatitis panel, and HIV are negative. Renal biopsy reveals diffuse thickening of the glomerular basement membrane without cellular proliferation. Immunofluorescence shows granular IgG and C3 deposition. Electron microscopy reveals subepithelial electron-dense deposits. Which of the following is the most likely diagnosis?

A. Minimal change disease

B. Membranous nephropathy (the most common cause of nephrotic syndrome in Caucasian adults)

C. Focal segmental glomerulosclerosis

D. Diabetic nephropathy

74. A 35-year-old man presents with gross hematuria, flank pain, and a palpable abdominal mass. CT reveals a large heterogeneous enhancing renal mass (10 cm) arising from the left kidney with extension into the left renal vein. No distant metastases are identified. Which of the following is the most likely diagnosis?

A. Renal cell carcinoma (classic triad of hematuria, flank pain, palpable mass)

B. Oncocytoma

C. Angiomyolipoma

D. Transitional cell carcinoma of the renal pelvis

75. A 65-year-old man with diabetes, hypertension, and CKD stage 4 (GFR 22 mL/min) presents with progressive fatigue, pallor, and dyspnea on exertion. Hemoglobin is 8.5 g/dL with normocytic normochromic indices. Iron studies are adequate (ferritin 250, transferrin saturation 28%). Reticulocyte count is low. B12 and folate are normal. Which of the following is the most likely cause of his anemia?

A. Iron deficiency anemia

B. Anemia of chronic disease only

C. Myelodysplastic syndrome

D. Anemia of chronic kidney disease (decreased erythropoietin production — treated with erythropoiesis-stimulating agents)

76. A 60-year-old woman presents with recurrent UTIs (4 in the past year). Cultures consistently grow E. coli. She is postmenopausal and reports vaginal dryness and dyspareunia. Physical examination reveals vaginal mucosal atrophy with loss of rugae and pale, dry vaginal epithelium. Post-void residual is 25 mL (normal). Which of the following is the most appropriate preventive measure?

A. Topical vaginal estrogen (restores vaginal flora and reduces UTI recurrence in postmenopausal women)

B. Prophylactic daily ciprofloxacin indefinitely

C. Chronic indwelling urinary catheter

D. Surgical urethral dilation

77. A 28-year-old man presents with acute kidney injury (creatinine rising from 0.9 to 5.8 mg/dL over 3 days). He was found unresponsive for an unknown duration after an opioid overdose. CK is 45,000 U/L. Urine is dark brown. Urinalysis is positive for blood on dipstick but shows no RBCs on microscopy. Urine myoglobin is positive. Which of the following is the most likely cause of his acute kidney injury?

A. Acute tubular necrosis from prerenal azotemia

B. Glomerulonephritis

C. Rhabdomyolysis-induced AKI (myoglobinuric renal injury)

D. Bilateral renal artery thrombosis

78. A 45-year-old woman presents with nephrotic syndrome (proteinuria 5.5 g/day, hypoalbuminemia, hyperlipidemia, edema). She has a history of IV drug use. HIV testing is positive with a CD4 count of 320 cells/μL. Renal biopsy reveals segmental sclerosis and hyalinosis of some glomeruli with podocyte injury. Immunofluorescence shows IgM and C3 in sclerotic areas. Electron microscopy reveals foot process effacement. Which of the following is the most likely diagnosis?

A. Membranous nephropathy

B. HIV-associated focal segmental glomerulosclerosis (FSGS — collapsing variant)

C. Minimal change disease

D. IgA nephropathy

SECTION 10: REPRODUCTIVE (6 Questions)

79. A 32-year-old nulliparous woman presents with 18 months of infertility, progressive dysmenorrhea, deep dyspareunia, and dyschezia (painful defecation) during menstruation. Physical examination reveals a fixed, retroverted uterus with nodularity along the uterosacral ligaments and tenderness in the posterior cul-de-sac. CA-125 is mildly elevated. Which of the following is the most likely diagnosis?

A. Adenomyosis

B. Uterine leiomyomas (fibroids)

C. Pelvic inflammatory disease

D. Endometriosis (gold standard diagnosis is laparoscopy)

80. A 45-year-old woman (G3P3) presents with heavy menstrual bleeding (soaking through a pad every hour for 3 days per cycle), iron deficiency anemia (hemoglobin 9.0 g/dL), and pelvic pressure. Pelvic ultrasound reveals an enlarged, irregularly contoured uterus (14 cm) with multiple well-circumscribed, heterogeneous, hypoechoic masses — the largest measuring 6 cm on the posterior wall (intramural). Endometrial biopsy is benign. She has completed childbearing and desires definitive treatment. Which of the following is the most appropriate definitive management?

A. Hysterectomy (definitive treatment for symptomatic fibroids in women who have completed childbearing)

B. GnRH agonist therapy as definitive long-term treatment

C. Uterine artery embolization as first choice

D. Myomectomy

81. A 52-year-old postmenopausal woman presents with vaginal bleeding. She is not on hormone replacement therapy. BMI is 38. She has a history of diabetes and hypertension. Transvaginal ultrasound reveals an endometrial thickness of 12 mm (greater than 4 mm threshold for postmenopausal women). Endometrial biopsy reveals well-differentiated endometrioid adenocarcinoma (Grade 1). MRI reveals tumor confined to the endometrium with no myometrial invasion. Which of the following is the most appropriate initial treatment?

A. Chemotherapy alone

B. Radiation therapy alone

C. Total hysterectomy with bilateral salpingo-oophorectomy, surgical staging (peritoneal washings, lymph node evaluation)

D. Oral progestin therapy as primary treatment

82. A 22-year-old woman at 28 weeks gestation is found to be Rh-negative (blood type O-negative). The father of the baby is Rh-positive. Indirect Coombs test (antibody screen) is negative. She has had no prior pregnancies, miscarriages, or blood transfusions. Which of the following is the most appropriate next step?

A. No intervention needed until delivery

B. Administer RhoGAM (anti-D immunoglobulin) at 28 weeks gestation (standard prophylaxis to prevent Rh alloimmunization)

C. Perform amniocentesis to determine fetal blood type

D. Administer RhoGAM only if the baby is found to be Rh-positive at delivery

83. A 34-year-old woman at 38 weeks gestation presents in active labor. She is GBS-positive based on rectovaginal culture at 36 weeks. She reports a history of anaphylaxis to penicillin (throat swelling, difficulty breathing). GBS isolate susceptibility testing shows resistance to clindamycin. Which of the following is the most appropriate intrapartum antibiotic for GBS prophylaxis?

A. Oral amoxicillin

B. IV clindamycin

C. IV erythromycin

D. IV vancomycin (used for penicillin-allergic patients with high-risk allergy AND clindamycin-resistant GBS)

84. A 26-year-old woman presents with a positive home pregnancy test and vaginal spotting. Quantitative beta-hCG is 1,200 mIU/mL. Transvaginal ultrasound reveals no intrauterine pregnancy and no adnexal mass. She is hemodynamically stable with mild left lower quadrant tenderness. Repeat beta-hCG in 48 hours is 1,100 mIU/mL (declining). Which of the following is the most likely diagnosis?

A. Early pregnancy failure (failing pregnancy of unknown location — declining beta-hCG indicates non-viable pregnancy rather than normal IUP or ectopic requiring intervention)

B. Normal intrauterine pregnancy too early to visualize

C. Ectopic pregnancy requiring immediate surgical intervention

D. Gestational trophoblastic disease

SECTION 11: DERMATOLOGY (4 Questions)

85. A 45-year-old woman presents with a butterfly-shaped erythematous rash across the malar eminences and bridge of the nose, sparing the nasolabial folds. She also reports photosensitivity, arthralgias, oral ulcers, and fatigue. ANA is positive at 1:640. Anti-dsDNA antibodies are positive. Complement C3 and C4 are low. Urinalysis reveals proteinuria and RBC casts. Which of the following is the most likely diagnosis?

A. Rosacea

B. Dermatomyositis

C. Systemic lupus erythematosus (SLE) with lupus nephritis

D. Contact dermatitis

86. A 60-year-old man presents with tense, non-ruptured bullae on the trunk and extremities. The bullae arise on both normal-appearing skin and erythematous skin. Nikolsky sign is negative (applying lateral pressure does not extend the blister). He has no mucosal involvement. Biopsy reveals subepidermal blister with eosinophilic infiltration. Direct immunofluorescence reveals linear IgG and C3 deposition along the basement membrane zone. Which of the following is the most likely diagnosis?

A. Pemphigus vulgaris

B. Bullous pemphigoid

C. Dermatitis herpetiformis

D. Stevens-Johnson syndrome

87. A 35-year-old man presents with an expanding annular erythematous patch with central clearing ("target lesion" or "bull's eye rash") on his right thigh. The lesion is 8 centimeters in diameter. He reports a camping trip in Connecticut 10 days ago and recalls removing a tick from that area. He has mild fatigue, headache, and myalgias. Which of the following is the most likely diagnosis?

A. Tinea corporis

B. Granuloma annulare

C. Cellulitis

D. Erythema migrans (Lyme disease — Borrelia burgdorferi transmitted by Ixodes tick)

88. A 20-year-old man presents with round or oval, salmon-colored, scaly patches distributed along the skin tension lines of the trunk in a "Christmas tree" pattern. He reports that 2 weeks prior, a single larger oval patch (5 cm) appeared on his chest before the generalized eruption. He has mild pruritus. The patches have a fine collarette of scale. RPR is negative. Which of the following is the most likely diagnosis?

A. Pityriasis rosea (herald patch followed by generalized eruption in Christmas tree distribution)

B. Secondary syphilis

C. Psoriasis

D. Tinea corporis

SECTION 12: EENT (6 Questions)

89. A 55-year-old woman with diabetes presents with sudden painless loss of vision in the right eye. She describes a "curtain" that descended over her visual field. Fundoscopic examination reveals a pale retina with a "cherry-red spot" at the macula. No hemorrhages are present. Fluorescein angiography reveals delayed retinal arterial filling. Which of the following is the most likely diagnosis?

A. Central retinal vein occlusion

B. Diabetic retinopathy

C. Central retinal artery occlusion (CRAO)

D. Acute angle-closure glaucoma

90. A 60-year-old man presents with acute onset of severe right eye pain, headache, nausea, vomiting, and blurred vision with halos around lights. The right eye is red with a fixed mid-dilated pupil. Intraocular pressure is 58 mmHg (normal 10-21). The cornea is hazy/edematous. The left eye has a shallow anterior chamber. Which of the following is the most likely diagnosis?

A. Open-angle glaucoma

B. Acute angle-closure glaucoma

C. Anterior uveitis (iritis)

D. Bacterial conjunctivitis

91. A 50-year-old man presents with recurrent episodes of vertigo lasting 20-60 minutes, accompanied by unilateral fluctuating hearing loss, tinnitus, and aural fullness in the left ear. Between episodes, he has some residual hearing loss. Audiometry reveals low-frequency sensorineural hearing loss in the left ear. Which of the following is the most likely diagnosis?

A. Benign paroxysmal positional vertigo (BPPV)

B. Vestibular neuritis

C. Acoustic neuroma

D. Ménière disease

92. A 30-year-old woman presents with sudden onset of severe vertigo, nausea, vomiting, and unsteadiness that began 2 days ago following a viral URI. She has continuous vertigo that does not change with position. She has horizontal nystagmus beating toward the unaffected ear. Head impulse test is positive (corrective saccade when the head is turned toward the affected side). There is no hearing loss or tinnitus. MRI brain is normal. Which of the following is the most likely diagnosis?

A. Vestibular neuritis (acute unilateral vestibulopathy)

B. Posterior fossa stroke

C. Ménière disease

D. Benign paroxysmal positional vertigo

93. A 7-year-old boy presents with purulent rhinorrhea, facial pain over the maxillary sinuses, cough worsening at night, and low-grade fever persisting for 12 days following a URI. Initially his URI symptoms improved, then worsened again ("double-worsening" pattern). He has tenderness to palpation over the maxillary sinuses bilaterally. Which of the following is the most appropriate initial treatment?

A. CT sinuses before any treatment

B. Intranasal corticosteroids alone

C. Amoxicillin-clavulanate (first-line antibiotic for acute bacterial rhinosinusitis lasting ≥10 days with no improvement or with double-worsening pattern)

D. Surgical sinus drainage

94. A 25-year-old man presents with progressive bilateral hearing loss over 2 years. His mother and grandmother both had hearing loss requiring surgery. Otoscopic examination is normal. Weber test lateralizes to the right (worse-hearing) ear. Rinne test on the right shows bone conduction greater than air conduction (negative Rinne). Audiometry reveals bilateral conductive hearing loss. Tympanometry reveals reduced tympanic membrane mobility with normal middle ear pressure. Which of the following is the most likely diagnosis?

A. Presbycusis

B. Otosclerosis (abnormal bone remodeling fixing the stapes footplate — causing conductive hearing loss)

C. Ménière disease

D. Cholesteatoma

SECTION 13: INFECTIOUS DISEASE (6 Questions)

95. A 35-year-old man presents with a 3-week history of low-grade fever, night sweats, malaise, and a new-onset heart murmur. He has a history of IV drug use. Blood cultures (3 of 3 sets) grow Staphylococcus aureus. Transesophageal echocardiogram reveals a 12-mm vegetation on the tricuspid valve with moderate tricuspid regurgitation. He has no peripheral embolic phenomena. Which of the following is the most likely risk factor for this valve involvement?

A. Rheumatic heart disease

B. Bicuspid aortic valve

C. Prosthetic valve

D. Intravenous drug use (IVDU — S. aureus is the most common organism; tricuspid valve is most commonly affected in right-sided IE from IVDU)

96. A 40-year-old man who recently returned from a trip to the Ohio River Valley presents with fever, cough, hilar lymphadenopathy, and erythema nodosum. Chest X-ray reveals bilateral mediastinal lymphadenopathy with a calcified pulmonary nodule. Urine Histoplasma antigen is positive. Which of the following is the most likely diagnosis?

A. Histoplasmosis (Histoplasma capsulatum — endemic to Ohio and Mississippi River Valleys, transmitted by inhalation of spores from bird/bat droppings)

B. Blastomycosis

C. Coccidioidomycosis

D. Tuberculosis

97. A 20-year-old college student presents with sudden onset of fever (104°F), severe headache, photophobia, neck stiffness, and a rapidly spreading petechial rash on the trunk and extremities that does not blanch with pressure. He was previously healthy. Lumbar puncture reveals CSF with WBC 2,500/µL (95% neutrophils), protein 280 mg/dL (elevated), glucose 18 mg/dL (low, with serum glucose 110 — CSF/serum glucose ratio 0.16), and gram-negative diplococci on Gram stain. Which of the following is the most likely causative organism?

A. Streptococcus pneumoniae

B. Listeria monocytogenes

C. Neisseria meningitidis (meningococcus — gram-negative diplococci, petechial/purpuric rash from DIC/meningococcemia)

D. Haemophilus influenzae type b

98. A 45-year-old man with poorly controlled HIV (CD4 count 45 cells/µL, not on ART) presents with 2 weeks of headache, fever, neck stiffness, and altered mental status. CSF analysis reveals elevated opening pressure (350 mm H2O), WBC 20 cells/µL (predominantly lymphocytes), protein 80 mg/dL, glucose 30 mg/dL, and India ink stain reveals encapsulated budding yeast. CSF cryptococcal antigen is positive at high titer. Which of the following is the most likely diagnosis?

A. Toxoplasma encephalitis

B. Cryptococcal meningitis (Cryptococcus neoformans — most common cause of meningitis in AIDS patients with severely depressed CD4)

C. Tuberculous meningitis

D. Progressive multifocal leukoencephalopathy

99. A 28-year-old woman presents with painful genital ulcers, tender inguinal lymphadenopathy (buboes — some suppurative), and a negative RPR. She reports a new sexual partner 5 days ago. Examination reveals three soft, painful, irregular ulcers with ragged undermined borders and purulent bases on the labia. HSV PCR is negative. Gram stain of ulcer base reveals gram-negative coccobacilli arranged in a "school of fish" pattern. Which of the following is the most likely diagnosis?

A. Primary syphilis

B. Genital herpes (HSV-2)

C. Lymphogranuloma venereum

D. Chancroid (Haemophilus ducreyi)

100. A 55-year-old man with a history of diabetes presents with severe right-sided facial pain and nasal congestion. He has been treated for sinusitis with antibiotics for 2 weeks without improvement. Examination reveals a black necrotic eschar on the right nasal turbinate and hard palate. CT sinus reveals opacification of the right maxillary and ethmoid sinuses with bony erosion. He has proptosis and decreased sensation over the right cheek (V2 distribution). KOH preparation of the necrotic tissue reveals broad, ribbon-like, non-septate hyphae branching at right (90-degree) angles. Which of the following is the most likely diagnosis?

A. Mucormycosis (rhinocerebral zygomycosis — caused by Rhizopus, Mucor species in immunocompromised/diabetic patients; non-septate broad hyphae with 90-degree branching)

B. Aspergillosis (septate hyphae with 45-degree branching — different from this presentation)

C. Squamous cell carcinoma of the sinus

D. Invasive fungal sinusitis from Aspergillus

COMPREHENSIVE PRACTICE EXAM 2: ANSWER KEY WITH EXPLANATIONS

SECTION 1: CARDIOVASCULAR

1. C. Non-ST elevation myocardial infarction (NSTEMI). NSTEMI is an acute coronary syndrome characterized by myocardial necrosis (elevated troponin) without ST elevation on ECG. ECG findings include ST depression and/or T-wave inversions, distinguishing it from STEMI (ST elevation) and unstable angina (no troponin elevation). NSTEMI and unstable angina share a common pathophysiology — atherosclerotic plaque rupture or erosion with superimposed non-occlusive thrombus causing partial coronary obstruction. Management includes dual antiplatelet therapy (aspirin plus P2Y12 inhibitor), anticoagulation (heparin), beta-blocker, statin, and risk stratification using TIMI or GRACE scores to determine timing of invasive strategy. Early invasive strategy (cardiac catheterization within 24 hours) is recommended for high-risk patients — elevated troponin, dynamic ST changes, hemodynamic instability, or high risk scores.

2. A. Oral anticoagulation with a DOAC or warfarin. Atrial fibrillation significantly increases stroke risk through left atrial stasis and thrombus formation. The CHA_2DS_2-VASc score stratifies stroke risk — Congestive heart failure (1), Hypertension (1), Age ≥75 (2), Diabetes (1), Stroke/TIA (2), Vascular disease (1), Age 65-74 (1), Sex category female (1). This patient's score of 6 places her at very high risk (approximately 9-10% annual stroke risk without anticoagulation). Anticoagulation is recommended for scores ≥2 in men and ≥3 in women. DOACs (apixaban, rivaroxaban, dabigatran, edoxaban) are preferred over warfarin for non-valvular AF due to predictable pharmacokinetics, fewer drug-food interactions, no routine INR monitoring, and lower intracranial hemorrhage risk. Aspirin alone provides insufficient stroke prevention in high-risk AF.

3. D. Alcoholic dilated cardiomyopathy. Alcoholic cardiomyopathy is a form of dilated cardiomyopathy resulting from chronic heavy alcohol consumption (typically greater than 7-8 drinks daily for more than 5 years). Alcohol is directly toxic to cardiomyocytes, causing myocyte necrosis, mitochondrial dysfunction, and impaired contractility. Echocardiographic findings include four-chamber dilation, global hypokinesis, severely reduced ejection fraction, and functional mitral and tricuspid regurgitation from annular dilation. Normal coronary arteries on catheterization exclude ischemic cardiomyopathy. Treatment includes complete alcohol abstinence (most important intervention — EF may significantly improve or normalize with sustained abstinence), standard HFrEF guideline-directed medical therapy (ACEi/ARB/ARNI, beta-blocker, MRA, SGLT2 inhibitor), and diuretics for volume management.

4. B. Rheumatic mitral stenosis. Rheumatic heart disease remains the most common cause of mitral stenosis worldwide, resulting from an autoimmune inflammatory response to Group A Streptococcal pharyngitis (molecular mimicry). Chronic inflammation causes commissural fusion, leaflet thickening, and chordal shortening, progressively narrowing the mitral valve orifice (normal area 4-6 cm^2). A valve area less than 1.5 cm^2 is considered significant stenosis. Classic auscultatory findings include a loud S1 (from forceful closure of thickened but still mobile leaflets), an opening snap (tensing of the stiffened valve in early diastole), and a low-pitched diastolic rumbling murmur at the apex (best heard with the bell in the left lateral decubitus position). Left atrial enlargement predisposes to atrial fibrillation, thromboembolism, and pulmonary hypertension. Treatment options include percutaneous mitral balloon valvuloplasty (if anatomy favorable) or surgical valve replacement.

5. C. Second-degree AV block, Mobitz Type I (Wenckebach). Mobitz Type I is characterized by progressive PR interval prolongation with each successive beat until a P wave fails to conduct (dropped QRS), after which the cycle resets. It results from decremental conduction in the AV node itself. Mobitz Type I is generally a benign condition — it occurs in trained athletes, during sleep, and with medications that slow AV conduction (beta-blockers, calcium channel blockers, digoxin). It typically does not progress to complete heart block and rarely requires permanent pacing unless highly symptomatic. This contrasts with Mobitz Type II (consistent PR intervals with sudden dropped beats without progressive prolongation — localized to the His-Purkinje system, higher risk of progression to complete heart block, often requires pacemaker). In this patient, medications and reversible causes should be evaluated before considering pacing.

6. A. ACE inhibitor or ARB. This patient has hypertension inadequately controlled on two agents plus diabetic nephropathy (elevated urine albumin-to-creatinine ratio). ACE inhibitors and ARBs are specifically indicated because they provide dual benefits — blood pressure reduction and nephroprotection. They reduce proteinuria and slow progression of diabetic kidney disease by decreasing intraglomerular pressure through preferential efferent arteriolar dilation (the efferent arteriole has a higher density of angiotensin II receptors). Major guidelines (ADA, KDIGO) recommend ACEi or ARB as first-line antihypertensive therapy in patients with diabetes and albuminuria regardless of blood pressure level. SGLT2 inhibitors provide additional nephroprotective benefit and should also be considered. Blood pressure target in diabetic kidney disease is less than 130/80 mmHg. Monitor potassium and creatinine after initiation.

7. B. Acute myocarditis. Acute myocarditis is inflammation of the myocardium, most commonly viral (coxsackievirus B, adenovirus, parvovirus B19, SARS-CoV-2). The typical presentation follows a viral prodrome by 1-2 weeks with chest pain, dyspnea, and heart failure symptoms. ECG findings may mimic MI (diffuse ST elevation, T-wave changes) or show arrhythmias. Troponin elevation with normal coronary arteries distinguishes myocarditis from MI. Cardiac MRI is the gold standard non-invasive diagnostic tool — patchy subepicardial or mid-wall late gadolinium enhancement (distinguishing it from MI, which shows subendocardial enhancement) with myocardial edema on T2-weighted imaging confirms the diagnosis. Echocardiogram may show wall motion abnormalities and reduced EF. Treatment is supportive — standard heart failure therapy, avoidance of NSAIDs (may worsen inflammation), activity restriction,

and monitoring for arrhythmias. Endomyocardial biopsy is reserved for fulminant cases or suspected giant cell myocarditis.

8. D. Cardiac amyloidosis (restrictive cardiomyopathy). Cardiac amyloidosis is the most common cause of restrictive cardiomyopathy, resulting from extracellular deposition of amyloid fibrils in the myocardium. AL (light chain) amyloidosis (from plasma cell dyscrasias) and ATTR (transthyretin) amyloidosis (hereditary or wild-type) are the two main types. The "sparkling" or "granular" echocardiographic appearance of the ventricular walls is a classic finding resulting from amyloid deposits. Biatrial enlargement with normal-sized ventricles, preserved or mildly reduced EF, and restrictive filling pattern are characteristic. Right-sided heart failure symptoms (JVD, hepatomegaly, ascites, peripheral edema) predominate because the stiff ventricles cannot accommodate normal diastolic filling. Low voltage on ECG (paradoxically low given the wall thickening) is a classic discordant finding. Diagnosis is confirmed by tissue biopsy (Congo red stain showing apple-green birefringence under polarized light) or technetium pyrophosphate scan for ATTR.

9. B. Digoxin. In hypertrophic cardiomyopathy with LVOT obstruction, medications that increase contractility, decrease preload, or decrease afterload worsen the dynamic obstruction. Digoxin is a positive inotrope — it increases contractility, which worsens the subaortic obstruction by increasing the velocity of blood flow through the narrowed LVOT and increasing systolic anterior motion of the mitral valve. Other contraindicated medications include dihydropyridine calcium channel blockers (vasodilation decreases afterload), pure vasodilators (nitrates, ACE inhibitors), and high-dose diuretics (excessive preload reduction). Appropriate medications include beta-blockers (negative inotrope, slow heart rate allowing longer diastolic filling), non-dihydropyridine CCBs (verapamil — negative inotrope), and disopyramide (negative inotrope with antiarrhythmic properties).

10. A. IV nicardipine or nitroprusside to gradually reduce MAP by 20-25% in the first hour. Hypertensive emergency is defined by severe blood pressure elevation (typically greater than 180/120) with evidence of acute end-organ damage — hypertensive encephalopathy (headache, confusion), retinopathy (papilledema, hemorrhages, exudates), acute kidney injury, acute heart failure, or aortic dissection. This patient has encephalopathy, retinopathy, and acute kidney injury. Treatment requires IV antihypertensive infusion in an ICU setting with continuous monitoring. The blood pressure should be reduced gradually — MAP reduced by no more than 20-25% in the first hour, then to 160/100 over the next 2-6 hours. Rapid normalization can cause watershed ischemia (stroke, MI, renal failure) because the autoregulatory curve has shifted rightward in chronic hypertension. IV nicardipine (titratable calcium channel blocker) is preferred; nitroprusside is an alternative.

11. C. Cardioversion can be considered now if TEE-guided or onset confirmed within 48 hours. In new-onset atrial fibrillation, the duration of the arrhythmia determines the cardioversion approach. If AF duration is confirmed to be less than 48 hours, cardioversion (pharmacologic with ibutilide, flecainide, or amiodarone; or electrical with synchronized DC cardioversion) can be performed with anticoagulation initiated at the time of cardioversion without prior TEE. If AF duration is greater than 48 hours or uncertain, two approaches exist — anticoagulate for at least 3 weeks before cardioversion (to allow

resolution of any atrial thrombus), or perform TEE to exclude left atrial appendage thrombus and cardiovert immediately if no thrombus is found. Anticoagulation must continue for at least 4 weeks after cardioversion regardless of approach (atrial stunning may persist). Long-term anticoagulation is based on CHA_2DS_2-VASc score.

12. D. Implantable cardioverter-defibrillator (ICD). For secondary prevention of sudden cardiac death (patients who have survived sustained ventricular tachycardia or ventricular fibrillation), ICD implantation is the standard of care and has demonstrated significant mortality reduction compared to antiarrhythmic drug therapy alone (AVID, CIDS, CASH trials). This patient has ischemic cardiomyopathy with severely reduced EF (30%) and recurrent sustained VT despite amiodarone — he meets criteria for both secondary prevention (survived VT) and primary prevention (EF ≤35% with NYHA class II-III symptoms on optimal medical therapy). The ICD continuously monitors cardiac rhythm and delivers therapy (antitachycardia pacing or shock) when life-threatening arrhythmias are detected. Amiodarone may be continued as adjunctive therapy to reduce ICD shocks. Catheter ablation of VT may also be considered to reduce VT burden.

13. B. Pulmonary arterial hypertension (PAH). PAH (WHO Group 1 pulmonary hypertension) is defined by mean pulmonary artery pressure greater than 20 mmHg at rest with a pulmonary capillary wedge pressure ≤15 mmHg (excluding left heart disease) and elevated pulmonary vascular resistance. Fenfluramine (appetite suppressant) is a well-established cause of drug-induced PAH through serotonin pathway dysregulation causing pulmonary vascular remodeling. PAH causes progressive right ventricular pressure overload — loud P2 (increased pulmonary artery pressure), right ventricular heave, and eventually right heart failure (peripheral edema, hepatomegaly). Right axis deviation and RV hypertrophy on ECG reflect chronic RV pressure overload. Treatment includes pulmonary vasodilators — endothelin receptor antagonists (bosentan), phosphodiesterase-5 inhibitors (sildenafil, tadalafil), prostacyclin analogs (epoprostenol, treprostinil), and soluble guanylate cyclase stimulators (riociguat).

14. A. Transcatheter aortic valve replacement (TAVR). TAVR has revolutionized management of severe symptomatic aortic stenosis in patients at high or prohibitive surgical risk. This patient has critical aortic stenosis (valve area 0.6 cm^2, mean gradient 58 mmHg) with all three classic symptoms (syncope, dyspnea, angina equivalent) and significant comorbidities (severe COPD, CKD) making surgical aortic valve replacement (SAVR) high risk. TAVR involves percutaneous deployment of a bioprosthetic valve within the native calcified aortic valve, typically via transfemoral approach. Major trials (PARTNER, CoreValve) demonstrated TAVR superiority or non-inferiority to SAVR in high-risk patients. Balloon valvuloplasty provides only temporary hemodynamic improvement (weeks to months) and is used as a bridge. Medical management alone carries dismal prognosis — approximately 50% mortality at 2 years for symptomatic severe AS.

15. C. Heart failure with preserved ejection fraction (HFpEF). HFpEF accounts for approximately 50% of all heart failure and is the dominant form in elderly women with hypertension, diabetes, and obesity. The pathophysiology involves concentric LV hypertrophy from chronic pressure overload (hypertension) causing impaired myocardial relaxation and increased LV stiffness, resulting in elevated

filling pressures despite normal systolic function (EF ≥50%). Diagnosis requires clinical heart failure symptoms (dyspnea, edema, orthopnea), preserved EF, evidence of diastolic dysfunction (abnormal relaxation pattern on Doppler, elevated E/e' ratio), and elevated natriuretic peptides (BNP or NT-proBNP). Treatment has historically been limited to volume management (diuretics) and comorbidity control. SGLT2 inhibitors (empagliflozin — EMPEROR-Preserved trial) are now the first proven therapy to reduce heart failure hospitalizations in HFpEF.

16. D. Wolff-Parkinson-White (WPW) syndrome. WPW is a pre-excitation syndrome caused by an accessory pathway (bundle of Kent) providing an additional electrical connection between the atria and ventricles that bypasses the AV node. ECG hallmarks include a short PR interval (less than 120 ms — rapid conduction bypassing the normal AV nodal delay), delta wave (slurred upstroke of the QRS from early ventricular depolarization via the accessory pathway), and widened QRS complex. WPW predisposes to reentrant tachyarrhythmias (orthodromic AVRT — narrow complex using the accessory pathway retrogradely) and, most dangerously, pre-excited atrial fibrillation (rapid conduction through the accessory pathway can cause ventricular fibrillation and sudden death). AV nodal blocking agents (adenosine, beta-blockers, calcium channel blockers, digoxin) are contraindicated in pre-excited AF because they may facilitate conduction through the accessory pathway. Definitive treatment is catheter ablation of the accessory pathway.

SECTION 2: PULMONARY

17. B. Interstitial lung disease (RA-associated ILD or methotrexate pneumonitis). Rheumatoid arthritis-associated ILD is a significant extra-articular manifestation affecting approximately 10% of RA patients clinically (up to 60% subclinically on HRCT). The usual interstitial pneumonia (UIP) pattern is the most common, though nonspecific interstitial pneumonia (NSIP) also occurs. Separately, methotrexate can cause drug-induced pneumonitis — a hypersensitivity reaction typically presenting with subacute dyspnea, cough, fever, and ground-glass opacities. Distinguishing RA-ILD from methotrexate pneumonitis is critical because management differs — RA-ILD may be treated with immunosuppression, while methotrexate pneumonitis requires immediate drug discontinuation and corticosteroids. Methotrexate pneumonitis can occur at any time during therapy regardless of cumulative dose. Bronchoalveolar lavage showing lymphocytosis suggests drug-induced pneumonitis. Pulmonary function testing characteristically shows restriction (reduced FVC, TLC) with reduced DLCO in both conditions.

18. A. Mild persistent asthma — initiate low-dose ICS. Asthma severity classification is based on impairment (symptom frequency, nighttime awakenings, rescue inhaler use, activity limitation) and risk (exacerbation frequency) before initiating controller therapy. Mild persistent asthma is defined by symptoms more than 2 days per week but not daily (this patient has 3-4 times weekly), nighttime awakenings 3-4 times monthly (this patient has twice monthly), rescue inhaler use more than 2 days per week but not daily, minor activity limitation, and FEV1 ≥80% predicted. Low-dose ICS (fluticasone 88-250 μg/day, budesonide 180-600 μg/day) is the recommended step 2 therapy. The 14% bronchodilator reversibility confirms the asthma diagnosis. An alternative step 2 option is as-needed low-dose ICS-

formoterol (SMART approach — single maintenance and reliever therapy). Moderate persistent asthma would require symptoms daily with some activity limitation.

19. D. Tissue biopsy followed by staging if malignant. This solitary pulmonary nodule has multiple high-risk features — large size (3 cm, approaching the 3 cm threshold where "nodule" becomes "mass"), spiculated irregular borders (highly suspicious for malignancy), high PET avidity (increased metabolic activity suggesting malignant cells), documented interval growth (doubling in 1 year), heavy smoking history (strongest risk factor for lung cancer), and patient age over 50. The probability of malignancy is very high (greater than 90% based on Bayesian analysis). Tissue diagnosis is mandatory before definitive treatment planning. CT-guided percutaneous transthoracic needle biopsy is preferred for peripheral lesions, while bronchoscopy (with endobronchial ultrasound — EBUS) is preferred for central lesions or hilar/mediastinal lymph node sampling. If biopsy confirms malignancy, comprehensive staging (PET-CT, brain MRI, pulmonary function testing) determines resectability and treatment approach.

20. C. Aspiration of oropharyngeal secretions containing anaerobic bacteria. Aspiration pneumonia and lung abscess result from aspiration of oropharyngeal secretions (colonized with anaerobic bacteria) into the lower respiratory tract. Risk factors include dysphagia (stroke, as in this patient), altered consciousness, poor dentition, GERD, and neurologic disorders. The dependent lung segments (posterior segments of the upper lobes and superior segments of the lower lobes when supine; basal segments of the lower lobes when upright) are most commonly affected. Anaerobic bacteria (Bacteroides, Fusobacterium, Peptostreptococcus) from the oral flora are the predominant organisms, producing the characteristic foul-smelling (putrid) sputum. Lung abscess appears as a cavitary lesion with an air-fluid level. Treatment is prolonged antibiotics — clindamycin or ampicillin-sulbactam for 4-6 weeks until radiographic resolution. Percutaneous or bronchoscopic drainage is considered for abscesses greater than 6 cm or failing antibiotic therapy.

21. B. VATS with pleurodesis. Recurrent spontaneous pneumothorax in patients with underlying lung disease (secondary spontaneous pneumothorax — SSP) carries significant morbidity and mortality. After the first recurrence of SSP (this patient's third episode), definitive surgical intervention is recommended because the recurrence rate after a second SSP exceeds 50%. VATS (video-assisted thoracoscopic surgery) allows identification and resection of blebs/bullae, repair of visceral pleural defects, and mechanical or chemical pleurodesis (creating adhesions between the visceral and parietal pleura to prevent future pneumothorax). Pleurodesis can be achieved mechanically (pleural abrasion), chemically (talc), or surgically (partial pleurectomy). Simple chest tube placement alone has a recurrence rate of approximately 30-50% for SSP. In patients with cystic fibrosis, the decision also considers potential future lung transplantation, as prior pleurodesis may complicate surgery.

22. D. Asbestosis with asbestos-related pleural disease. Asbestosis is a diffuse interstitial pulmonary fibrosis caused by inhalation of asbestos fibers, with a typical latency period of 15-20 years between exposure and disease onset. Shipyard workers, construction workers, insulation installers, and brake mechanics have the highest exposure risk. Bilateral pleural plaques (calcified or non-calcified) on the parietal pleura are the most common manifestation of asbestos exposure and are often incidental findings.

Lower lobe-predominant reticular opacities progressing to honeycombing represent parenchymal fibrosis (asbestosis). Pulmonary function shows restriction with reduced DLCO. There is no specific treatment — management is supportive with supplemental oxygen, pulmonary rehabilitation, and monitoring for complications. Asbestos exposure increases the risk of malignant mesothelioma (pleural tumor, 30-40 year latency) and bronchogenic carcinoma (risk multiplied by smoking — synergistic effect).

23. A. Acute respiratory distress syndrome (ARDS). ARDS is a syndrome of acute, diffuse, inflammatory lung injury causing non-cardiogenic pulmonary edema with severe hypoxemia. The Berlin Definition requires acute onset (within 1 week of a known insult), bilateral opacities on imaging not fully explained by effusions, atelectasis, or nodules, respiratory failure not fully explained by cardiac failure or fluid overload (PCWP ≤18 mmHg), and PaO2/FiO2 ratio classification — mild (200-300), moderate (100-200), severe (less than 100). This patient has severe ARDS (P/F ratio 120) with an identified trigger (sepsis from pneumonia — the most common cause). Management includes lung-protective ventilation (low tidal volume 6 mL/kg ideal body weight, plateau pressure less than 30 cm H2O), prone positioning for moderate-severe ARDS (improves V/Q matching and mortality), conservative fluid management, and treatment of the underlying cause. Neuromuscular blockade and ECMO may be considered for refractory hypoxemia.

24. C. Radiation-induced pulmonary fibrosis. Radiation pneumonitis and fibrosis are well-recognized complications of thoracic radiation therapy, typically occurring in a predictable temporal sequence. Radiation pneumonitis occurs 1-6 months after treatment with cough, dyspnea, and fever; radiation fibrosis develops 6-12 months later and is irreversible. The distribution typically corresponds to the radiation port but may extend beyond it. Upper lobe-predominant fibrosis following breast cancer radiation affecting the ipsilateral lung field is characteristic. The 10-year latency in this patient is consistent with the chronic, progressive nature of radiation fibrosis. Pulmonary function shows restriction with reduced DLCO. No evidence of cancer recurrence on imaging excludes lymphangitic carcinomatosis and lung metastases. Treatment is supportive — corticosteroids may help early pneumonitis but are ineffective for established fibrosis.

25. D. Obesity hypoventilation syndrome with cor pulmonale. OHS (Pickwickian syndrome) is defined by the triad of obesity (BMI ≥30, typically ≥40), daytime hypercapnia (PaCO2 greater than 45 mmHg while awake), and sleep-disordered breathing, after exclusion of other causes of hypoventilation. The ABG demonstrates chronic hypercapnic respiratory failure (elevated PaCO2 58) with metabolic compensation (elevated HCO3 34 — indicating chronic process). Severe OSA (AHI 52) contributes to nocturnal hypoventilation, but the defining feature distinguishing OHS from isolated OSA is the daytime hypercapnia. Chronic hypoxemia and hypercapnia cause pulmonary vasoconstriction, leading to pulmonary hypertension and cor pulmonale (right heart failure — RV dilation, elevated PA pressures, peripheral edema). Treatment includes positive airway pressure therapy (CPAP for OSA component; bilevel PAP with backup rate if persistent hypoventilation), supplemental oxygen, and weight loss (bariatric surgery if indicated).

26. B. Exudative malignant pleural effusion. Pleural effusions are classified as transudative or exudative using Light's criteria — an effusion is exudative if it meets any one of the following: pleural fluid protein/serum protein ratio greater than 0.5, pleural fluid LDH/serum LDH ratio greater than 0.6, or pleural fluid LDH greater than 2/3 the upper limit of normal serum LDH. This effusion meets all three criteria, confirming it as exudative. The positive cytology definitively establishes malignancy as the cause. Malignant pleural effusions are common in lung cancer, breast cancer, and lymphoma. Additional features suggesting malignancy include low glucose (less than 60 mg/dL), low pH (less than 7.30), elevated LDH, and bloody appearance. Management of recurrent malignant effusions includes therapeutic thoracentesis for symptom relief, tunneled pleural catheter (PleurX) for outpatient drainage, or chemical pleurodesis (talc) for definitive management.

27. D. Airborne isolation, contact tracing, and health department reporting. Active pulmonary tuberculosis, especially cavitary disease (highest infectivity due to enormous bacillary burden — approximately 10^7-10^9 organisms per mL of cavity contents), requires immediate public health measures alongside medical treatment. Airborne isolation in a negative-pressure room with healthcare workers wearing N95 respirators is mandatory. TB is a reportable disease in all US jurisdictions — immediate notification to the local health department triggers contact investigation to identify and evaluate all close contacts. Contact tracing involves TST or IGRA testing of exposed individuals, with treatment of latent TB infection (LTBI) for those who test positive. This patient's HIV coinfection complicates management — ART should be initiated within 2 weeks for those with CD4 less than 50 and within 8 weeks for higher CD4 counts, balancing the risk of immune reconstitution inflammatory syndrome (IRIS).

28. A. Eosinophilic granulomatosis with polyangiitis (EGPA). EGPA (formerly Churg-Strauss syndrome) is a systemic necrotizing vasculitis characterized by the triad of asthma (typically severe, adult-onset), peripheral eosinophilia (often greater than 10%), and extravascular eosinophilic granulomas. It typically progresses through three phases — allergic phase (asthma, allergic rhinitis, nasal polyps), eosinophilic phase (peripheral eosinophilia, eosinophilic tissue infiltration — pneumonia, gastroenteritis), and vasculitic phase (systemic vasculitis affecting small-to-medium vessels — mononeuritis multiplex, skin lesions, cardiac, renal, GI involvement). p-ANCA (anti-MPO) is positive in approximately 40-60% of cases. Mononeuritis multiplex (asymmetric peripheral neuropathy from vasculitis of vasa nervorum) is one of the most common and disabling manifestations. Treatment includes high-dose corticosteroids plus cyclophosphamide or rituximab for severe disease. Cardiac involvement is the leading cause of mortality.

SECTION 3: GASTROINTESTINAL/NUTRITIONAL

29. C. Barrett esophagus without dysplasia. Barrett esophagus is a premalignant condition in which the normal stratified squamous epithelium of the distal esophagus is replaced by specialized intestinal-type columnar epithelium with goblet cells (intestinal metaplasia). This metaplastic change results from chronic GERD and is a response to ongoing acid-peptic injury. The endoscopic appearance of salmon-colored velvety mucosa extending above the GEJ replacing pale squamous epithelium is characteristic. Barrett esophagus is the primary risk factor for esophageal adenocarcinoma, with an annual progression rate of

approximately 0.5% per year for non-dysplastic Barrett. Surveillance intervals depend on dysplasia grade — no dysplasia requires EGD every 3-5 years, low-grade dysplasia every 6-12 months (or endoscopic eradication), and high-grade dysplasia requires endoscopic eradication therapy (radiofrequency ablation or endoscopic mucosal resection). All patients should receive PPI therapy.

30. B. Achalasia. Achalasia is an esophageal motility disorder characterized by failure of LES relaxation and absent peristalsis in the esophageal body, caused by progressive degeneration of inhibitory neurons (nitric oxide and VIP-producing) in the myenteric (Auerbach) plexus. Dysphagia for both solids and liquids simultaneously (suggesting a motility disorder rather than mechanical obstruction, which typically presents with solid dysphagia first) and regurgitation of undigested food are hallmarks. The "bird's beak" appearance on barium swallow (smooth, tapered narrowing at the GEJ with dilated proximal esophagus) is pathognomonic. Esophageal manometry is the gold standard — elevated resting LES pressure, incomplete LES relaxation, and absent or abnormal peristalsis. Treatment options include pneumatic balloon dilation (graded dilation of the LES), surgical myotomy (Heller myotomy with partial fundoplication), and peroral endoscopic myotomy (POEM). Botulinum toxin injection provides temporary relief.

31. D. Arteriovenous malformation (angiodysplasia). Angiodysplasia (arteriovenous malformations) of the colon is the most common vascular anomaly of the GI tract and a leading cause of acute lower GI bleeding in elderly patients. These are degenerative, thin-walled, dilated blood vessels in the submucosa that are prone to rupture. The cecum and right colon are the most common locations (approximately 70%). Bleeding is typically painless and arterial in nature, presenting with bright red blood per rectum or hematochezia that may be massive. Colonoscopy reveals flat, red, fern-like vascular lesions. The absence of surrounding inflammation or diverticulum in this case distinguishes angiodysplasia from diverticular bleeding. Heyde syndrome is the association of aortic stenosis with GI bleeding from angiodysplasia (acquired von Willebrand syndrome from shear stress destruction of large vWF multimers). Treatment includes endoscopic ablation (argon plasma coagulation), angiographic embolization for active bleeding, and surgery for refractory cases.

32. A. Symptomatic cholelithiasis (biliary colic). Biliary colic is episodic, visceral pain caused by transient gallstone impaction in the cystic duct during gallbladder contraction (stimulated by fatty meal-induced cholecystokinin release). Pain is typically steady (not truly "colicky" despite the name), located in the RUQ or epigastrium, lasting 30 minutes to several hours, and resolving when the stone disimpacts. Normal WBC, liver enzymes, and bilirubin argue against cholecystitis (WBC elevated), choledocholithiasis (elevated bilirubin and liver enzymes), and cholangitis. Normal gallbladder wall thickness and absence of pericholecystic fluid exclude acute cholecystitis. Definitive treatment is laparoscopic cholecystectomy for recurrent symptomatic episodes. Asymptomatic gallstones (incidentally discovered) do not require treatment. Ursodeoxycholic acid may be used for dissolution of small cholesterol stones in patients who are poor surgical candidates.

33. C. Portal hypertension from cirrhosis. The serum-ascites albumin gradient (SAAG) is the most useful test for determining the etiology of ascites. SAAG = serum albumin minus ascitic fluid albumin.

SAAG ≥1.1 g/dL indicates portal hypertension as the cause (cirrhosis, heart failure, Budd-Chiari syndrome), while SAAG less than 1.1 g/dL indicates non-portal hypertensive causes (peritoneal carcinomatosis, tuberculosis peritonitis, nephrotic syndrome, pancreatic ascites). This patient's SAAG of 2.2 strongly indicates portal hypertension from cirrhosis. The low PMN count (less than 250 cells/μL) excludes spontaneous bacterial peritonitis. Management of cirrhotic ascites includes sodium restriction (less than 2 g/day), diuretics (spironolactone plus furosemide in a 100:40 ratio), large-volume paracentesis with albumin replacement for tense ascites, and TIPS for refractory ascites.

34. B. Crohn disease. Crohn disease is distinguished from ulcerative colitis by several key features — transmural inflammation (affecting all bowel wall layers, enabling fistula and stricture formation), skip lesions (discontinuous inflammation with normal intervening segments), terminal ileum predilection (the most commonly affected site, though any portion of the GI tract from mouth to anus can be involved), non-caseating granulomas on biopsy (found in approximately 30-50% of cases), and deep linear ulcers creating a "cobblestone" mucosal pattern. Rectal sparing (normal rectum) is typical of Crohn but would be unusual for UC (which invariably begins in the rectum). Perianal disease (fistulae, fissures, abscesses) is characteristic of Crohn and does not occur in UC. Treatment includes 5-ASA for mild disease, corticosteroids for flares, immunomodulators (azathioprine, 6-mercaptopurine, methotrexate), and biologic agents (anti-TNF, vedolizumab, ustekinumab) for moderate-severe disease.

35. D. Pancreatic adenocarcinoma. Pancreatic head adenocarcinoma is the classic cause of painless obstructive jaundice. The tumor compresses the common bile duct as it passes through or adjacent to the pancreatic head, causing progressive biliary obstruction (conjugated hyperbilirubinemia, dark urine from bilirubinuria, clay-colored stools from absent fecal urobilinogen). Courvoisier sign (palpable, non-tender, distended gallbladder in the setting of jaundice) occurs because the gallbladder dilates due to gradual biliary obstruction (distinguishing it from gallstone obstruction, which typically produces a scarred, non-distensible gallbladder). The "double duct sign" (simultaneous dilation of both the CBD and pancreatic duct) on imaging strongly suggests a pancreatic head mass. CA 19-9 is the most commonly used tumor marker (elevated in approximately 80% of pancreatic cancers). Prognosis is dismal — only 15-20% of patients have resectable disease at diagnosis, and overall 5-year survival is approximately 10%.

36. A. IV cefotaxime empirically. Spontaneous bacterial peritonitis (SBP) is a common and life-threatening complication of cirrhotic ascites, occurring in approximately 10-30% of hospitalized cirrhotic patients with ascites. Diagnosis is made when the ascitic fluid absolute PMN count is ≥250 cells/μL, regardless of culture results (cultures are negative in approximately 40% of cases — "culture-negative neutrocytic ascites" is treated identically). Gram stain is positive in less than 25% of cases. The most common organisms are enteric gram-negative bacteria (E. coli most common, followed by Klebsiella). Third-generation cephalosporins (cefotaxime 2 g IV every 8 hours for 5 days) are first-line empiric therapy. IV albumin (1.5 g/kg on day 1, 1 g/kg on day 3) reduces mortality and hepatorenal syndrome when given with antibiotics. After SBP resolution, lifelong prophylaxis with daily norfloxacin or TMP-SMX is recommended due to the approximately 70% one-year recurrence rate.

37. C. Irritable bowel syndrome (IBS). IBS is a functional gastrointestinal disorder defined by the Rome IV criteria — recurrent abdominal pain at least 1 day per week for the past 3 months, associated with two or more of the following: related to defecation (pain improves or worsens with bowel movements), associated with a change in stool frequency, or associated with a change in stool form. This patient meets criteria with pain related to defecation and alternating stool patterns. Importantly, IBS is a diagnosis of exclusion requiring absence of alarm features (unintentional weight loss, rectal bleeding, nocturnal symptoms, anemia, fever, family history of GI malignancy/IBD) and normal laboratory and endoscopic evaluation. IBS subtypes include IBS-C (constipation-predominant), IBS-D (diarrhea-predominant), and IBS-M (mixed). Treatment includes dietary modification (low FODMAP diet), fiber supplementation, antispasmodics (dicyclomine, hyoscyamine), and neuromodulators (TCAs, SSRIs) for refractory symptoms.

38. D. Hepatocellular carcinoma (HCC). HCC is the most common primary liver malignancy and the leading cause of death in patients with cirrhosis. Hepatitis C cirrhosis is one of the major risk factors (along with hepatitis B, alcoholic cirrhosis, NAFLD/NASH cirrhosis, and hemochromatosis). Surveillance with ultrasound every 6 months (with or without AFP) is recommended for all cirrhotic patients. HCC can be diagnosed non-invasively (without biopsy) in cirrhotic patients when imaging demonstrates the characteristic "arterial enhancement with venous washout" pattern on contrast-enhanced CT or MRI — this reflects the predominantly hepatic arterial blood supply of HCC (normal liver receives approximately 75% portal venous blood). AFP greater than 400 ng/mL in the setting of a liver mass in a cirrhotic patient is highly suggestive. The Barcelona Clinic Liver Cancer (BCLC) staging system guides treatment — options include resection, liver transplantation (Milan criteria), ablation, transarterial chemoembolization (TACE), and systemic therapy.

SECTION 4: MUSCULOSKELETAL

39. B. Polymyalgia rheumatica (PMR). PMR is an inflammatory condition affecting adults over 50 (peak incidence at 70-80 years) characterized by bilateral shoulder and hip girdle pain and stiffness with markedly elevated inflammatory markers (ESR typically greater than 40, often greater than 80). Morning stiffness lasting more than 45 minutes is characteristic. Crucially, muscle strength is preserved — the pain limits active range of motion, but passive range of motion is full, distinguishing PMR from inflammatory myopathies (polymyositis, dermatomyositis) where actual muscle weakness is present. Normal CK excludes primary muscle disease. PMR is strongly associated with giant cell arteritis (GCA) — approximately 15-20% of PMR patients develop GCA, and approximately 50% of GCA patients have PMR symptoms. Treatment with low-dose corticosteroids (prednisone 12.5-25 mg/day) produces dramatic improvement within 24-72 hours — this rapid response is virtually diagnostic and helps confirm the diagnosis.

40. A. Dermatomyositis with malignancy screening indicated. Dermatomyositis is an idiopathic inflammatory myopathy characterized by proximal muscle weakness plus pathognomonic cutaneous findings — heliotrope rash (violaceous discoloration of the upper eyelids, often with periorbital edema),

Gottron papules (erythematous to violaceous papules over the dorsal MCP, PIP, and DIP joints), shawl sign (erythema over the upper back, shoulders, and neck), and V-sign (erythema over the anterior chest). Elevated CK confirms muscle damage, EMG shows myopathic changes (short-duration, low-amplitude, polyphasic motor unit potentials with fibrillation potentials), and MRI reveals muscle edema. A critical clinical consideration is the strong association with underlying malignancy — adults with dermatomyositis have an approximately 15-25% risk of occult cancer (particularly ovarian, lung, GI, breast, and lymphoma), necessitating age-appropriate cancer screening at diagnosis and for 3-5 years thereafter. Treatment includes corticosteroids and steroid-sparing immunosuppressants (methotrexate, azathioprine, IVIG).

41. C. Reactive arthritis. Reactive arthritis (formerly Reiter syndrome) is a seronegative spondyloarthropathy triggered by preceding genitourinary (Chlamydia trachomatis) or enteric (Salmonella, Shigella, Campylobacter, Yersinia) infection. The classic triad — "can't see, can't pee, can't climb a tree" — describes conjunctivitis (or anterior uveitis), urethritis, and asymmetric oligoarthritis (typically large joints of the lower extremities). Keratoderma blennorrhagicum (hyperkeratotic, painless papules on palms and soles — histologically identical to pustular psoriasis) and circinate balanitis (painless ulcers on the glans penis) are characteristic mucocutaneous findings. HLA-B27 positivity is present in approximately 60-80% of cases. Joint aspirate is inflammatory but sterile — the organism is not present in the joint (distinguishing reactive arthritis from septic arthritis). Treatment includes NSAIDs (first-line), intra-articular corticosteroids, DMARDs (sulfasalazine) for chronic disease, and TNF inhibitors for refractory cases.

42. D. Patellofemoral pain syndrome. Patellofemoral pain syndrome (PFPS) is the most common cause of anterior knee pain, particularly in young, active females. It results from abnormal patellar tracking within the femoral trochlear groove during knee flexion and extension, caused by quadriceps weakness (especially vastus medialis oblique), patellar malalignment, increased Q angle, or overuse. The "theater sign" (pain worsening with prolonged sitting with the knees flexed) is classic. Pain is exacerbated by activities that increase patellofemoral compressive forces — squatting, stair climbing, running, and jumping. Positive patellar grind test (Clarke test) reproduces pain with patellar compression against the trochlea during quadriceps contraction. No effusion, normal ligamentous stability, and absence of joint line tenderness distinguish PFPS from ACL injury, meniscal tear, and tibiofemoral pathology. Treatment is physical therapy emphasizing quadriceps strengthening, patellar taping/bracing, and activity modification.

43. A. Pain management, bracing, and osteoporosis treatment. Vertebral compression fractures are the most common osteoporotic fracture, affecting approximately 25% of postmenopausal women. Conservative management is appropriate for stable compression fractures without neurologic deficits — including analgesics (acetaminophen, NSAIDs, short-course opioids if needed), thoracolumbar bracing (TLSO for comfort and to limit flexion), early mobilization (prolonged bed rest is avoided as it accelerates bone loss and deconditioning), and aggressive osteoporosis treatment. A T-score of -3.2 indicates severe osteoporosis requiring pharmacologic therapy — bisphosphonates (alendronate, zoledronic acid) are first-line, reducing future fracture risk by 40-70%. For patients with very high fracture risk, anabolic agents

(teriparatide, romosozumab) may be considered initially. Vertebral augmentation (vertebroplasty or kyphoplasty) may be considered for persistent severe pain unresponsive to conservative therapy after 6 weeks.

44. B. L5-S1 disc herniation affecting the S1 nerve root. Lumbar disc herniation most commonly occurs at L4-L5 and L5-S1 levels. Posterolateral herniations (most common direction) typically compress the traversing nerve root — at L5-S1, this affects the S1 nerve root. S1 radiculopathy presents with pain radiating down the posterior thigh and calf to the lateral foot and small toes (S1 dermatome), weakness of foot plantarflexion and difficulty with toe-walking, decreased ankle (Achilles) reflex, and decreased sensation over the lateral foot. Positive straight leg raise test (reproduction of radicular pain with leg elevation between 30-70°) indicates nerve root tension. In contrast, L5 radiculopathy (from L4-L5 disc) causes weakness of great toe dorsiflexion (EHL), foot drop, sensory loss over the dorsum of the foot, and no reflex changes. Conservative management (NSAIDs, physical therapy, epidural injections) resolves most disc herniations within 6-8 weeks. Surgery is indicated for cauda equina syndrome, progressive neurologic deficits, or intractable symptoms.

45. D. Cervical myelopathy from atlantoaxial instability. Atlantoaxial (C1-C2) subluxation is a serious complication of rheumatoid arthritis, occurring in approximately 25-50% of patients with longstanding RA. Chronic inflammation causes erosion of the transverse ligament of C1 (which normally holds the odontoid process of C2 against the anterior arch of C1), allowing anterior subluxation of C1 on C2. This narrows the spinal canal and can compress the cervical spinal cord, causing myelopathy. Lhermitte sign (electrical shock sensation radiating down the spine with neck flexion) indicates cervical cord irritation. Myelopathic signs include upper motor neuron findings (hyperreflexia, spasticity, Babinski sign), gait ataxia, hand weakness with difficulty with fine motor tasks, and bladder dysfunction. This is a neurosurgical emergency requiring surgical stabilization (posterior cervical fusion) to prevent irreversible spinal cord injury. All RA patients should have cervical spine imaging before intubation for surgery.

46. C. Osteosarcoma. Osteosarcoma is the most common primary malignant bone tumor in children and adolescents, with peak incidence during the adolescent growth spurt (10-20 years). It characteristically affects the metaphysis of long bones, particularly around the knee (distal femur and proximal tibia account for approximately 60% of cases). Classic radiographic features include a mixed lytic-sclerotic lesion, sunburst periosteal reaction (radiating spicules of reactive bone extending perpendicular to the cortex), and Codman triangle (triangular elevation of periosteum at the tumor margin). Elevated serum alkaline phosphatase and LDH are common. This is distinguished from Ewing sarcoma, which affects the diaphysis, shows an "onion-skin" periosteal reaction, and consists of small round blue cells. Treatment is neoadjuvant chemotherapy (doxorubicin, cisplatin, methotrexate), followed by limb-salvage surgery or amputation, then adjuvant chemotherapy.

47. A. Chronic corticosteroid use. Osteonecrosis (avascular necrosis) of the femoral head results from disruption of blood supply to the subchondral bone, leading to bone cell death, structural collapse, and secondary osteoarthritis. Chronic corticosteroid use is the most common cause of non-traumatic osteonecrosis, accounting for approximately 35-40% of cases. The mechanism involves corticosteroid-

induced fat cell hypertrophy in the marrow (increasing intraosseous pressure and reducing blood flow), lipid embolism, and direct toxic effects on osteocytes. Risk increases with higher doses and longer duration, though AVN can occur with relatively short courses. Other risk factors include excessive alcohol use, SLE itself, sickle cell disease, and radiation therapy. The crescent sign on X-ray represents subchondral fracture (collapse of necrotic bone). MRI is the most sensitive diagnostic study, detecting AVN before radiographic changes. Early-stage disease may be managed with core decompression; advanced disease with femoral head collapse requires total hip arthroplasty.

48. B. Biologic therapy — TNF inhibitor or IL-17 inhibitor. For axial spondyloarthritis (including ankylosing spondylitis) with inadequate response to NSAIDs (which are first-line), biologic therapy is the recommended next step. Conventional DMARDs (methotrexate, sulfasalazine, leflunomide) are ineffective for axial disease in AS (they may help peripheral joint involvement). TNF inhibitors (adalimumab, etanercept, infliximab, golimumab, certolizumab) are the established first-line biologics for axial SpA, demonstrating significant improvement in pain, stiffness, function, and MRI-detected inflammation. IL-17 inhibitors (secukinumab, ixekizumab) are newer alternatives with demonstrated efficacy in axial SpA. JAK inhibitors (tofacitinib, upadacitinib) are additional options. The presence of anterior uveitis may favor certain TNF inhibitors (monoclonal antibodies — adalimumab, infliximab — are more effective for uveitis than the receptor fusion protein etanercept).

SECTION 5: HEMATOLOGY

49. D. Chronic myeloid leukemia (CML). CML is a myeloproliferative neoplasm characterized by the Philadelphia chromosome — the t(9;22) translocation creating the BCR-ABL fusion gene, which encodes a constitutively active tyrosine kinase driving uncontrolled myeloid proliferation. CML typically presents in the chronic phase with leukocytosis showing the full spectrum of myeloid maturation (unlike AML, which shows a "maturation arrest" with predominant blasts). Basophilia and eosinophilia are characteristic. Splenomegaly (often massive) from extramedullary hematopoiesis causes early satiety. The peripheral smear shows predominantly mature myeloid cells with less than 10% blasts (chronic phase). CML progresses through accelerated phase (10-19% blasts) to blast crisis (≥20% blasts — behaving like acute leukemia). Treatment with tyrosine kinase inhibitors (imatinib — first-generation; dasatinib, nilotinib — second-generation) targeting the BCR-ABL protein has transformed CML from a fatal disease to a chronic, manageable condition with near-normal life expectancy.

50. C. Chronic lymphocytic leukemia (CLL). CLL is the most common leukemia in adults in Western countries, typically affecting elderly individuals (median age 70). It results from clonal proliferation of mature-appearing but functionally incompetent B lymphocytes. The peripheral smear is diagnostic — monotonous population of small, mature-appearing lymphocytes with "smudge cells" (fragile lymphocytes that rupture during smear preparation). Flow cytometry confirms the diagnosis with a characteristic immunophenotype — CD5+ (usually a T-cell marker, aberrantly expressed on CLL B cells), CD19+, CD20 dim (low expression), and CD23+. This immunophenotype distinguishes CLL from mantle cell lymphoma (CD5+, CD23-, cyclin D1+). Painless lymphadenopathy and splenomegaly from

lymphocyte infiltration are common. Many patients are asymptomatic at diagnosis and managed with observation ("watch and wait"). Treatment indications include symptomatic disease, rapid lymphocyte doubling time, cytopenias, and massive organomegaly.

51. D. Hodgkin lymphoma. Hodgkin lymphoma is characterized by the presence of Reed-Sternberg cells — large, malignant cells with bilobed or multilobed nuclei containing prominent eosinophilic nucleoli, creating the pathognomonic "owl-eye" appearance. RS cells are positive for CD15 and CD30 on immunohistochemistry and negative for CD20 (distinguishing them from most B-cell non-Hodgkin lymphomas). HL has a bimodal age distribution (peak at 15-35 and over 55), contiguous lymph node spread (unlike NHL which spreads non-contiguously), and frequently presents with painless cervical or supraclavicular lymphadenopathy and mediastinal involvement. "B symptoms" (unexplained fever greater than 38°C, drenching night sweats, unintentional weight loss greater than 10% in 6 months) are present in approximately 40% of patients and affect staging and prognosis. Treatment with ABVD chemotherapy (Adriamycin, Bleomycin, Vinblastine, Dacarbazine) achieves cure rates exceeding 80% for early-stage disease.

52. A. Warm autoimmune hemolytic anemia (AIHA). Warm AIHA is caused by IgG autoantibodies that bind to red blood cells at body temperature (37°C), causing extravascular hemolysis primarily in the spleen. The positive direct Coombs test (DAT) detecting IgG on the RBC surface is diagnostic. Laboratory findings of hemolysis include elevated LDH, elevated indirect bilirubin, undetectable haptoglobin (consumed binding free hemoglobin), reticulocytosis (bone marrow compensatory response), and spherocytes on peripheral smear (partial phagocytosis by splenic macrophages removes membrane, creating spherical cells). Warm AIHA is associated with autoimmune diseases (SLE — the most common association, as in this patient), lymphoproliferative disorders (CLL, lymphoma), and medications (methyldopa, penicillin). Treatment is corticosteroids (prednisone 1 mg/kg/day — first-line), rituximab (anti-CD20 — second-line), and splenectomy for refractory cases. Transfusion may be necessary for severe symptomatic anemia but crossmatching is difficult.

53. C. Aplastic anemia. Aplastic anemia is a bone marrow failure syndrome characterized by pancytopenia (anemia, leukopenia, thrombocytopenia) with a hypocellular bone marrow replaced by fat. The inappropriately low reticulocyte count (less than 1%) indicates inadequate marrow response to anemia — distinguishing aplastic anemia from peripheral destruction (hemolysis, hypersplenism) where reticulocytes are elevated. Causes include idiopathic/autoimmune (most common — T-cell mediated destruction of hematopoietic stem cells), drugs (chloramphenicol, NSAIDs, antiepileptics), toxins (benzene), infections (parvovirus B19, hepatitis, EBV), and radiation exposure. Severity classification — severe aplastic anemia requires bone marrow cellularity less than 25% plus at least two of: neutrophils less than 500, platelets less than 20,000, or reticulocytes less than 60,000. Treatment depends on age and severity — allogeneic hematopoietic stem cell transplant (curative, preferred for young patients with matched donor) or immunosuppressive therapy (anti-thymocyte globulin plus cyclosporine).

54. B. Von Willebrand disease. VWD is the most common inherited bleeding disorder, affecting approximately 1% of the population. Von Willebrand factor (vWF) has two critical functions — it mediates

platelet adhesion to injured endothelium (via GP Ib receptor) and carries/stabilizes factor VIII in the circulation. VWD causes a mixed bleeding pattern — mucocutaneous bleeding (epistaxis, menorrhagia, easy bruising, GI bleeding — from impaired platelet adhesion) and prolonged bleeding after procedures. Laboratory findings include prolonged bleeding time (impaired platelet function), mildly prolonged PTT (from secondary factor VIII deficiency — vWF stabilizes FVIII, and low vWF causes accelerated FVIII clearance), normal PT, and normal platelet count. Decreased ristocetin cofactor activity (measures vWF function) and decreased ristocetin-induced platelet aggregation (RIPA) confirm VWD. Treatment includes desmopressin (DDAVP — releases stored vWF from endothelial cells, effective for type 1) and vWF-containing factor VIII concentrates for severe disease.

SECTION 6: ENDOCRINE

55. D. Subacute (De Quervain) thyroiditis. Subacute granulomatous thyroiditis is a self-limited inflammatory condition typically following a viral upper respiratory infection by 2-8 weeks. It is characterized by a painful, tender thyroid gland (unlike Hashimoto and Graves, which are painless), fever, malaise, and elevated ESR. The disease progresses through four phases — thyrotoxic phase (1-2 months — thyroid follicle destruction releases preformed hormone, causing hyperthyroidism with suppressed TSH and elevated T4), hypothyroid phase (1-3 months — depleted hormone stores), and recovery phase (most patients return to euthyroid status). Low radioactive iodine uptake (RAIU less than 5%) during the thyrotoxic phase is critical for distinguishing subacute thyroiditis from Graves disease (which has elevated RAIU). Granulomatous inflammation with multinucleated giant cells on FNA is characteristic. Treatment is NSAIDs for pain (first-line), corticosteroids for severe cases, and beta-blockers for thyrotoxic symptoms.

56. A. Fine needle aspiration biopsy. The evaluation of thyroid nodules follows a systematic approach — TSH is measured first (if suppressed, indicating a potentially autonomously functioning "hot" nodule, RAIU scan is performed), followed by ultrasound characterization, and then FNA based on ultrasound features and size. This nodule has multiple high-suspicion ultrasound features — solid composition, hypoechogenicity, irregular margins, microcalcifications (psammoma bodies — strongly associated with papillary thyroid carcinoma), and taller-than-wide shape. These features collectively confer greater than 70% risk of malignancy. FNA (performed under ultrasound guidance) is the gold standard for evaluating thyroid nodules, with results reported using the Bethesda System for Reporting Thyroid Cytopathology. With a normal TSH, RAIU scan is not indicated as first-line. Observation alone would be inappropriate given the high-suspicion features. FNA results guide subsequent management.

57. C. Hyperosmolar hyperglycemic state (HHS). HHS is a life-threatening complication of type 2 diabetes characterized by severe hyperglycemia (typically greater than 600 mg/dL), marked hyperosmolality (greater than 320 mOsm/kg), profound dehydration (average fluid deficit 8-10 liters), and altered mental status — without significant ketoacidosis (pH greater than 7.30, minimal or absent ketonuria). In T2DM, sufficient residual insulin prevents lipolysis and ketogenesis, but is inadequate to prevent hepatic glucose production and hyperglycemia. HHS is distinguished from DKA by the absence

of significant acidosis and ketosis, more severe hyperglycemia, and higher osmolality. Precipitating factors include infection (most common — UTI in this case), medication non-compliance, acute illness, and new-onset diabetes. Treatment mirrors DKA — aggressive IV fluid resuscitation (most important initial step), IV insulin infusion, electrolyte replacement (particularly potassium), and treatment of the precipitating cause. Mortality is approximately 5-20% — higher than DKA due to the older population and comorbidities.

58. B. Toxic adenoma. A toxic adenoma (autonomously functioning thyroid nodule) is a benign thyroid adenoma that produces thyroid hormone independently of TSH stimulation due to activating mutations in the TSH receptor or Gs-alpha protein. The radioactive iodine uptake scan shows a single "hot" nodule (concentrating iodine intensely) with suppressed uptake in the surrounding thyroid tissue (from TSH suppression by autonomous hormone production). This distinguishes it from Graves disease (diffuse homogeneous uptake), toxic multinodular goiter (multiple hot nodules), and subacute thyroiditis (globally decreased uptake). Toxic adenomas rarely harbor malignancy. Treatment options include radioactive iodine ablation (most common definitive treatment), surgical excision (hemithyroidectomy), or antithyroid medications (methimazole) as temporizing or long-term therapy. Beta-blockers provide symptomatic relief.

59. A. Primary hyperaldosteronism (Conn syndrome). Primary hyperaldosteronism is the most common cause of secondary hypertension, present in approximately 5-10% of hypertensive patients and up to 20% of those with resistant hypertension. Autonomous aldosterone overproduction (from an adrenal adenoma — 35%, or bilateral adrenal hyperplasia — 60%) causes sodium retention, volume expansion, hypertension, potassium wasting (hypokalemia), and metabolic alkalosis (renal hydrogen ion excretion). The elevated aldosterone-to-renin ratio (ARR greater than 30 with aldosterone greater than 15 ng/dL) is the screening test. Suppressed renin distinguishes primary (autonomous adrenal production) from secondary hyperaldosteronism (renin-driven, from renal artery stenosis, heart failure, or cirrhosis). CT revealing a unilateral adrenal adenoma suggests Conn syndrome. Adrenal venous sampling is performed to confirm lateralization before surgery. Treatment for adenoma is laparoscopic adrenalectomy (curative); bilateral hyperplasia is treated with mineralocorticoid receptor antagonists (spironolactone, eplerenone).

60. D. Surgical hypoparathyroidism. Hypoparathyroidism following thyroid surgery is the most common cause of acquired hypoparathyroidism, occurring from inadvertent removal or devascularization of the parathyroid glands during thyroidectomy (the four parathyroid glands are located on the posterior surface of the thyroid). Absent PTH leads to hypocalcemia (decreased bone resorption and decreased intestinal calcium absorption from reduced 1,25-dihydroxyvitamin D synthesis) and hyperphosphatemia (decreased renal phosphate excretion). Symptoms of hypocalcemia reflect increased neuromuscular excitability — perioral numbness, paresthesias, muscle cramping, carpopedal spasm, and potentially laryngospasm, seizures, and cardiac arrhythmias (prolonged QTc). Chvostek sign (facial nerve tapping) and Trousseau sign (carpopedal spasm with blood pressure cuff inflation — more specific) are classic provocative tests. Treatment is IV calcium gluconate for acute symptomatic hypocalcemia, followed by oral calcium and calcitriol (active vitamin D — PTH is required for renal 1-alpha-hydroxylation of vitamin D). Lifelong calcium and calcitriol supplementation is typically required.

SECTION 7: NEUROLOGY

61. B. Mechanical thrombectomy. This patient presents beyond the 4.5-hour IV tPA window (last seen normal 8 hours ago), making IV thrombolysis contraindicated. However, mechanical thrombectomy (endovascular intervention using stent retrievers or aspiration devices to physically remove the clot) can be performed up to 24 hours after symptom onset in selected patients with large vessel occlusion (LVO) and favorable perfusion imaging (demonstrating salvageable tissue — ischemic penumbra). The DAWN and DEFUSE-3 trials established the efficacy of thrombectomy in the extended window (6-24 hours) for patients with a mismatch between the infarct core (DWI on MRI) and the ischemic penumbra (perfusion imaging). This patient's complete MCA occlusion with a significant penumbra makes him an ideal candidate. Number needed to treat (NNT) for thrombectomy is approximately 2.6 — meaning approximately 1 in 3 patients achieves functional independence.

62. A. High-dose corticosteroids initiated immediately. Giant cell arteritis (temporal arteritis) is a systemic large-vessel vasculitis affecting branches of the external carotid artery (temporal, occipital) and the ophthalmic artery. It almost exclusively affects patients over 50 (mean age 70) and is strongly associated with PMR. The most feared complication is irreversible vision loss from anterior ischemic optic neuropathy (AION) — occurring in approximately 15-20% of untreated patients. When GCA is suspected clinically (temporal headache, scalp tenderness, jaw claudication, visual symptoms, elevated ESR/CRP), high-dose corticosteroids must be initiated immediately — do not wait for temporal artery biopsy results. Prednisone 40-60 mg daily (or IV methylprednisolone for visual symptoms) is started upon clinical suspicion. Biopsy should be performed within 2 weeks of starting steroids (histologic findings persist). Biopsy reveals granulomatous inflammation with multinucleated giant cells and fragmentation of the internal elastic lamina. Steroids are tapered slowly over 1-2 years with ESR/CRP monitoring.

63. D. Normal pressure hydrocephalus (NPH). NPH is a potentially reversible cause of dementia characterized by the classic triad of gait disturbance (magnetic gait — wide-based, shuffling, feet appear "glued to the floor"), urinary incontinence (initially urgency, then incontinence), and cognitive decline (primarily frontal/subcortical pattern — apathy, psychomotor slowing, executive dysfunction). The gait disturbance is typically the earliest and most prominent symptom. CT or MRI reveals ventriculomegaly (enlarged ventricles) disproportionate to sulcal atrophy (distinguishing NPH from hydrocephalus ex vacuo in Alzheimer disease, where sulci are widened proportionally). The large-volume lumbar puncture ("tap test" — removal of 30-50 mL CSF) serves as both a diagnostic and prognostic tool — clinical improvement (particularly gait) within hours to days predicts a favorable response to definitive treatment. Definitive treatment is ventriculoperitoneal (VP) shunt placement.

64. C. Valproic acid or lamotrigine. Generalized epilepsy with 3-Hz spike-and-wave discharges requires a broad-spectrum antiepileptic drug. Narrow-spectrum AEDs (carbamazepine, phenytoin, oxcarbazepine) can paradoxically worsen generalized seizures by exacerbating absence seizures, myoclonic seizures, and generalized spike-and-wave discharges. Valproic acid is highly effective for all generalized seizure types but carries significant teratogenic risk (neural tube defects — approximately 6-9%) and is generally avoided in women of childbearing potential. Lamotrigine is preferred in women of childbearing age — it

has broad-spectrum efficacy with a more favorable teratogenic profile (approximately 2-3% risk). Other broad-spectrum options include levetiracetam and topiramate. Driving restrictions for epilepsy vary by state but generally require a seizure-free period of 3-12 months before driving is permitted.

65. A. Guillain-Barré syndrome (AIDP). GBS is an acute inflammatory demyelinating polyradiculoneuropathy caused by autoimmune attack on peripheral nerve myelin, often triggered by preceding infection (Campylobacter jejuni — most common, approximately 30%; also CMV, EBV, HIV, Zika). The hallmark is ascending symmetric weakness beginning in the distal lower extremities and progressing proximally over days to weeks, often with sensory symptoms (paresthesias) preceding weakness. Hyporeflexia or areflexia is characteristic (from demyelination impairing reflex arcs). Nerve conduction studies show demyelinating features — prolonged distal latencies, conduction block, temporal dispersion, and reduced conduction velocities. CSF albuminocytologic dissociation (elevated protein with normal WBC count — less than 10 cells/μL) is the classic finding, though may be normal in the first week. Respiratory failure requiring intubation occurs in approximately 25-30% of patients — serial forced vital capacity monitoring is essential. Treatment is IVIG or plasma exchange (plasmapheresis) — both are equally effective.

66. B. Myasthenia gravis with thymoma. Myasthenia gravis is an autoimmune disease caused by antibodies against the nicotinic acetylcholine receptor (AChR) at the neuromuscular junction, causing impaired neuromuscular transmission. The hallmark is fatigable weakness — symptoms worsen with repeated muscle use and improve with rest. Ocular symptoms (ptosis, diplopia) are the most common initial presentation (approximately 50-65%), and approximately 80-90% eventually develop generalized weakness. The edrophonium (Tensilon) test provides transient improvement by inhibiting acetylcholinesterase, increasing ACh availability at the NMJ. Anti-AChR antibodies are positive in approximately 85% of generalized MG. Thymoma (anterior mediastinal mass) is present in approximately 10-15% of MG patients, and thymectomy is recommended for all thymomatous MG and for non-thymomatous generalized MG in patients under 65. Treatment includes pyridostigmine (symptomatic), immunosuppression (prednisone, azathioprine, mycophenolate), and IVIG or plasmapheresis for myasthenic crisis.

SECTION 8: PSYCHIATRY/BEHAVIORAL HEALTH

67. D. Generalized anxiety disorder (GAD). GAD is characterized by excessive, uncontrollable worry about multiple life domains (not limited to a single concern, distinguishing it from specific phobias or social anxiety) for at least 6 months, accompanied by at least 3 of 6 somatic symptoms — restlessness, fatigue, difficulty concentrating, irritability, muscle tension, and sleep disturbance. This patient meets all criteria with 2-year duration and significant functional impairment. GAD is distinguished from panic disorder (discrete panic attacks), social anxiety disorder (fear limited to social/performance situations), PTSD (trauma-related), and adjustment disorder (identifiable stressor, less than 6 months duration). First-line treatment includes SSRIs (sertraline, escitalopram) or SNRIs (venlafaxine, duloxetine) for pharmacotherapy, and cognitive behavioral therapy (CBT). Buspirone is an alternative with anxiolytic

properties without sedation or dependence risk. Benzodiazepines are effective but reserved for short-term use due to dependence and tolerance.

68. C. Rule out substance-induced mood disorder. This case illustrates the critical importance of excluding substance-induced psychiatric disorders before diagnosing primary psychiatric conditions. Amphetamines (including Adderall — mixed amphetamine salts) are potent CNS stimulants that can produce symptoms indistinguishable from a manic episode — euphoria, grandiosity, decreased need for sleep, pressured speech, psychomotor agitation, impulsivity, and even psychotic features. The positive urine drug screen for amphetamines raises the strong possibility that this presentation is substance-induced. DSM-5 requires that symptoms not be better explained by substance use before diagnosing bipolar disorder. Appropriate management includes substance discontinuation, observation, supportive care, and short-term symptomatic treatment (benzodiazepines for agitation, antipsychotics if needed). If manic symptoms persist beyond the expected duration of substance effects (typically days for amphetamines), reevaluation for a primary mood disorder is warranted.

69. A. Obsessive-compulsive disorder (OCD). OCD is characterized by obsessions (recurrent, intrusive, unwanted thoughts, urges, or images causing marked anxiety) and compulsions (repetitive behaviors or mental acts performed in response to obsessions to reduce anxiety). The person recognizes the thoughts as excessive (ego-dystonic — they are distressed by the thoughts, which distinguishes OCD from delusional disorders where beliefs are ego-syntonic). Common obsession themes include contamination, symmetry/ordering, harm, and religious/sexual taboos. Corresponding compulsions include washing/cleaning, checking, counting, and mental rituals. Symptoms are time-consuming (greater than 1 hour/day) and cause significant functional impairment. First-line treatment is CBT with exposure and response prevention (ERP — the most effective psychotherapy, involving gradual exposure to feared stimuli while preventing the compulsive response) and/or SSRIs at higher doses than used for depression (fluoxetine 40-80 mg, fluvoxamine, sertraline). Clomipramine (TCA with strong serotonergic properties) is effective but has more side effects.

70. B. Dementia with Lewy bodies. DLB is the second most common neurodegenerative dementia (after Alzheimer disease). Core clinical features include fluctuating cognition (pronounced variations in attention and alertness), recurrent well-formed visual hallucinations (typically detailed and vivid — seeing people or animals that aren't present), and spontaneous parkinsonism (rigidity, bradykinesia, tremor). REM sleep behavior disorder (acting out dreams — loss of normal REM atonia) often precedes cognitive symptoms by years and is a strong suggestive feature. DLB is distinguished from Parkinson disease dementia (PDD) by the "one-year rule" — in DLB, dementia occurs before or within one year of parkinsonian motor symptoms, while in PDD, dementia develops more than one year after established motor Parkinson disease. A critical clinical consideration is severe sensitivity to antipsychotic medications (neuroleptic sensitivity) — even low doses can cause severe parkinsonism, rigidity, obtundation, or neuroleptic malignant syndrome.

71. C. Borderline personality disorder. BPD is characterized by a pervasive pattern of instability in interpersonal relationships, self-image, affect, and marked impulsivity beginning by early adulthood.

DSM-5 requires 5 or more of 9 criteria — frantic efforts to avoid abandonment, unstable intense relationships (idealization-devaluation), identity disturbance, impulsivity (spending, sex, substance use, binge eating, reckless driving), recurrent suicidal behavior or self-mutilation, affective instability (intense episodic dysphoria, irritability, anxiety), chronic emptiness, inappropriate intense anger, and transient stress-related paranoia or dissociation. This patient demonstrates at least 6 criteria. BPD is distinguished from bipolar disorder by the chronic, persistent nature of affective instability (minutes to hours, not days to weeks) and the interpersonal relationship patterns. First-line treatment is dialectical behavior therapy (DBT — developed specifically for BPD, incorporating mindfulness, distress tolerance, emotion regulation, and interpersonal effectiveness skills). Pharmacotherapy targets specific symptoms rather than the disorder itself.

72. D. Delirium (likely anticholinergic toxicity). Delirium is an acute confusional state characterized by fluctuating consciousness, inattention, and cognitive disturbance developing over hours to days. Key distinguishing features from dementia include acute onset (hours-days versus months-years), fluctuating course (waxing and waning), prominent attention deficit, and potential reversibility. This patient has multiple features suggesting anticholinergic toxicity from oxybutynin — dry mucous membranes, tachycardia, urinary retention, dilated pupils ("hot as a hare, dry as a bone, blind as a bat, mad as a hatter, red as a beet"). Common medications with anticholinergic properties include antihistamines (diphenhydramine), bladder antimuscarinics (oxybutynin), TCAs, and antipsychotics. Elderly patients are particularly susceptible due to decreased cholinergic reserve and altered drug metabolism. Management involves identifying and treating the underlying cause (discontinue oxybutynin), supportive care, reorientation, and avoiding physical restraints and sedating medications. Physostigmine may be used for severe anticholinergic delirium.

SECTION 9: RENAL/UROGENITAL

73. B. Membranous nephropathy. Membranous nephropathy is the most common cause of primary nephrotic syndrome in Caucasian adults (ages 30-60). It is characterized by immune complex deposition on the subepithelial (outer) side of the glomerular basement membrane, causing GBM thickening without cellular proliferation. The characteristic histologic triad includes diffuse GBM thickening on light microscopy, granular IgG and C3 deposition along capillary loops on immunofluorescence, and subepithelial electron-dense deposits on electron microscopy. Primary (idiopathic) membranous nephropathy is associated with anti-phospholipase A2 receptor (PLA2R) antibodies (present in approximately 70%). Secondary causes include malignancy (lung, colon, breast), infections (hepatitis B, syphilis), autoimmune diseases (SLE — "class V lupus nephritis"), and medications (NSAIDs, gold, penicillamine). Approximately one-third of patients spontaneously remit, one-third have persistent proteinuria, and one-third progress to ESRD. Treatment for high-risk patients includes rituximab or calcineurin inhibitors.

74. A. Renal cell carcinoma. The classic triad of hematuria, flank pain, and palpable abdominal mass occurs in only approximately 10% of patients with RCC but is virtually diagnostic when present. RCC is

the most common primary renal malignancy in adults, arising from the proximal convoluted tubule epithelium. Clear cell carcinoma is the most common subtype (approximately 70-80%). Risk factors include smoking, obesity, hypertension, acquired cystic kidney disease, and Von Hippel-Lindau syndrome. Extension into the renal vein (and potentially the IVC) is a characteristic feature of RCC and occurs in approximately 10% of cases. Paraneoplastic syndromes are common — erythrocytosis (from EPO production), hypercalcemia (from PTHrP), hypertension (from renin), and Stauffer syndrome (hepatic dysfunction without liver metastases). Treatment for localized disease is radical or partial nephrectomy. Advanced disease is treated with immunotherapy (checkpoint inhibitors) and targeted therapy (VEGF/mTOR inhibitors).

75. D. Anemia of chronic kidney disease (decreased EPO production). Anemia is a nearly universal complication of advanced CKD, with prevalence increasing as GFR declines (present in approximately 50% of CKD stage 4 and 75% of CKD stage 5 patients). The primary mechanism is decreased erythropoietin (EPO) production by the failing kidneys — EPO is produced by peritubular interstitial fibroblasts in the renal cortex, and their progressive loss reduces EPO synthesis. The anemia is characteristically normocytic, normochromic, and hypoproliferative (low reticulocyte count despite adequate iron stores). Adequate iron stores (ferritin greater than 200, TSAT greater than 20% in CKD patients) exclude functional iron deficiency, which must be corrected before starting EPO therapy. Treatment involves erythropoiesis-stimulating agents (ESAs — epoetin alfa, darbepoetin alfa), targeting hemoglobin 10-11.5 g/dL (avoiding higher targets due to increased cardiovascular risk demonstrated in TREAT and CREATE trials). Iron supplementation is given to maintain ferritin 200-500 and TSAT 20-30%.

76. A. Topical vaginal estrogen. Recurrent UTIs in postmenopausal women are strongly associated with estrogen deficiency-related changes in the urogenital tract. Declining estrogen levels cause vaginal mucosal atrophy, loss of lactobacilli (the predominant commensal organisms that maintain acidic vaginal pH), increased vaginal pH, and colonization with uropathogenic gram-negative bacteria (particularly E. coli). Topical vaginal estrogen (cream, ring, or tablet) restores vaginal epithelial integrity, recolonizes with lactobacilli, lowers vaginal pH, and significantly reduces UTI recurrence — studies demonstrate approximately 50% reduction in recurrent UTIs. This is preferred over systemic estrogen (which has less local effect and more systemic risks) and over prophylactic antibiotics (which contribute to antibiotic resistance). Other preventive measures include adequate hydration, cranberry products (modest evidence), and post-coital voiding.

77. C. Rhabdomyolysis-induced AKI. Rhabdomyolysis is the breakdown of skeletal muscle with release of intracellular contents — myoglobin, CK, potassium, phosphorus, and uric acid — into the circulation. Common causes include crush injury, prolonged immobilization (this patient was found unresponsive), seizures, extreme exertion, and statins. Myoglobin is toxic to the renal tubules — it causes direct tubular injury, vasoconstriction, and tubular obstruction by myoglobin casts. The urinalysis finding of positive blood on dipstick (detects both hemoglobin and myoglobin — the dipstick cannot distinguish between them) with no RBCs on microscopy is highly characteristic of myoglobinuria. CK greater than 5 times normal (typically greater than 10,000 U/L for AKI risk) confirms rhabdomyolysis. Treatment is aggressive

IV normal saline (goal urine output 200-300 mL/hour) to dilute myoglobin concentration, maintain renal perfusion, and prevent cast formation. Monitoring and treatment of hyperkalemia (potentially life-threatening), hyperphosphatemia, and hypocalcemia are essential.

78. B. HIV-associated FSGS. Focal segmental glomerulosclerosis is characterized by segmental sclerosis and hyalinosis affecting some (focal) glomeruli and portions (segmental) of affected glomeruli, with podocyte injury and foot process effacement. HIV-associated nephropathy (HIVAN) is a specific form of FSGS, typically the collapsing variant (characterized by global or segmental wrinkling and collapse of the glomerular capillary tuft). HIVAN classically presents with heavy proteinuria (nephrotic syndrome), rapidly progressive renal failure, and large echogenic kidneys on ultrasound (unlike most chronic kidney diseases that show small kidneys). It predominantly affects patients of African descent with advanced HIV (low CD4 count). The most important treatment is initiation of antiretroviral therapy (ART), which can stabilize or improve renal function. ACE inhibitors or ARBs are added for proteinuria reduction. Without treatment, HIVAN progresses to ESRD within months.

SECTION 10: REPRODUCTIVE

79. D. Endometriosis. Endometriosis is defined by the presence of functional endometrial tissue (glands and stroma) outside the uterine cavity, most commonly on the ovaries, uterosacral ligaments, cul-de-sac (pouch of Douglas), and pelvic peritoneum. The classic symptom triad includes dysmenorrhea (progressive, secondary — worsening over time), dyspareunia (deep, with posterior fornix involvement), and infertility (present in approximately 30-50% of endometriosis patients). Dyschezia (painful defecation during menses) suggests rectovaginal or cul-de-sac involvement. A fixed, retroverted uterus with uterosacral nodularity on examination is highly suggestive. CA-125 may be mildly elevated but is neither sensitive nor specific. Laparoscopy with biopsy remains the gold standard for definitive diagnosis — classic findings include powder-burn or chocolate-colored implants, endometriomas ("chocolate cysts" on the ovaries), and adhesions. Medical treatment includes combined hormonal contraceptives, progestins, GnRH agonists, and GnRH antagonists. Surgical excision or ablation of implants is performed for medical treatment failures or infertility.

80. A. Hysterectomy. Uterine leiomyomas (fibroids) are the most common benign tumors of the female reproductive tract, affecting approximately 70% of women by age 50. This patient has symptomatic fibroids causing menorrhagia with resulting iron deficiency anemia and bulk symptoms (pelvic pressure from the enlarged uterus). Having completed childbearing and desiring definitive treatment, hysterectomy is the most appropriate option — it is the only treatment that eliminates fibroids permanently (recurrence rate is zero). For women desiring future fertility, myomectomy (surgical removal of individual fibroids while preserving the uterus) is preferred. Uterine artery embolization is an effective alternative for women who wish to avoid hysterectomy but have completed childbearing. GnRH agonists (leuprolide) are used as short-term preoperative adjuncts (shrink fibroids and correct anemia before surgery) but are not definitive due to regrowth upon discontinuation and bone density concerns with long-term use.

81. C. Total hysterectomy with BSO and surgical staging. Endometrial cancer is the most common gynecologic malignancy in the United States, with risk factors including obesity (excess adipose tissue converts androgens to estrogen via aromatase), diabetes, hypertension, unopposed estrogen exposure, nulliparity, early menarche, late menopause, and tamoxifen use. Endometrioid adenocarcinoma (type I) is the most common histologic subtype (approximately 80%) and is associated with estrogen excess. Any postmenopausal vaginal bleeding requires evaluation — transvaginal ultrasound (endometrial thickness greater than 4 mm warrants tissue sampling) followed by endometrial biopsy. Standard treatment for most endometrial cancers is total hysterectomy with bilateral salpingo-oophorectomy and surgical staging (peritoneal cytology, pelvic and para-aortic lymph node evaluation, and omental biopsy for high-grade tumors). Adjuvant therapy (radiation, chemotherapy) is based on surgical staging and histologic risk factors. Prognosis for early-stage, well-differentiated endometrioid carcinoma is excellent (5-year survival greater than 90%).

82. B. Administer RhoGAM at 28 weeks. Rh alloimmunization prevention is one of the most important routine prenatal interventions. An Rh-negative mother carrying an Rh-positive fetus can develop anti-D antibodies if fetal RBCs enter the maternal circulation (fetomaternal hemorrhage during delivery, miscarriage, ectopic pregnancy, amniocentesis, abdominal trauma, or spontaneous transplacental hemorrhage). Anti-D antibodies can cause hemolytic disease of the fetus and newborn (HDFN) in subsequent pregnancies. Prevention involves RhoGAM (anti-D immunoglobulin) administration — 300 μg IM at 28 weeks gestation (prophylactic, covering small fetomaternal hemorrhages in the third trimester) and within 72 hours of delivery if the infant is confirmed Rh-positive (covers delivery-related fetomaternal hemorrhage). RhoGAM is also given after any sensitizing event (miscarriage, ectopic, amniocentesis, abdominal trauma). A negative antibody screen at 28 weeks confirms no prior sensitization.

83. D. IV vancomycin. GBS intrapartum prophylaxis prevents early-onset neonatal GBS infection. Penicillin G is first-line (narrow spectrum, highly effective). For penicillin-allergic patients, the approach depends on allergy severity and GBS susceptibility. Patients with low-risk penicillin allergy (rash only) receive IV cefazolin. For high-risk allergy (anaphylaxis, angioedema, respiratory distress, urticaria — as in this patient), the choice depends on GBS susceptibility — if the isolate is clindamycin-susceptible, IV clindamycin is given; if clindamycin-resistant (as in this patient), IV vancomycin is the appropriate alternative. This algorithm prevents potentially fatal anaphylaxis while ensuring adequate GBS coverage. Oral antibiotics are not appropriate for intrapartum prophylaxis (inadequate bactericidal levels). Erythromycin is no longer recommended for GBS prophylaxis due to increasing resistance.

84. A. Early pregnancy failure (failing PUL). This patient has a pregnancy of unknown location (no IUP or adnexal mass on TVUS) with a declining beta-hCG, indicating a non-viable pregnancy. The declining beta-hCG pattern (from 1,200 to 1,100 over 48 hours) indicates pregnancy failure regardless of location. A normal early intrauterine pregnancy would show at least a 49% rise in beta-hCG over 48 hours (previously described as "doubling"). A beta-hCG above the discriminatory zone (typically 1,500-2,000 mIU/mL for TVUS) without a visible IUP raises concern for ectopic pregnancy — however, a declining hCG indicates the pregnancy is already failing and does not require immediate intervention if the patient is hemodynamically stable with minimal symptoms. Serial hCG monitoring to confirm continued decline

toward zero is appropriate. If the hCG plateaus or rises, methotrexate or surgical intervention may be needed.

SECTION 11: DERMATOLOGY

85. C. Systemic lupus erythematosus with lupus nephritis. SLE is a chronic autoimmune disease with multisystem involvement. The malar (butterfly) rash — an erythematous, flat or raised rash over the malar eminences and nasal bridge sparing the nasolabial folds — is the most recognizable cutaneous feature (present in approximately 50% of SLE patients). The nasolabial fold sparing distinguishes it from rosacea (which involves the nasolabial folds). This patient meets ACR/EULAR classification criteria with malar rash, photosensitivity, arthralgias, oral ulcers, positive ANA, positive anti-dsDNA (highly specific for SLE), low complement (indicating complement consumption by immune complexes), and renal involvement (proteinuria, RBC casts indicating glomerulonephritis). Lupus nephritis occurs in approximately 50% of SLE patients and is a major determinant of morbidity and mortality. The ISN/RPS classification (Classes I-VI based on renal biopsy) guides treatment — proliferative nephritis (Class III/IV) requires aggressive immunosuppression (mycophenolate or cyclophosphamide plus corticosteroids).

86. B. Bullous pemphigoid. Bullous pemphigoid is the most common autoimmune blistering disease, predominantly affecting elderly patients (over 60). IgG autoantibodies target hemidesmosomal proteins (BP180 and BP230) at the dermal-epidermal junction, causing subepidermal blister formation. The blisters are tense (do not easily rupture because the full epidermis forms the blister roof, unlike the flaccid blisters of pemphigus vulgaris where the split is intraepidermal). Nikolsky sign is negative (lateral pressure does not extend the blister — positive in pemphigus). Mucosal involvement is uncommon (unlike pemphigus vulgaris, where oral mucosal involvement often precedes skin lesions). Direct immunofluorescence showing linear IgG and C3 deposition along the basement membrane zone is diagnostic. Treatment includes potent topical corticosteroids (first-line for localized disease), systemic corticosteroids, and steroid-sparing immunosuppressants (doxycycline, dapsone, mycophenolate, azathioprine).

87. D. Erythema migrans (Lyme disease). Erythema migrans is the pathognomonic skin manifestation of early localized Lyme disease, caused by Borrelia burgdorferi transmitted through the bite of Ixodes ticks (blacklegged/deer ticks). The rash appears 3-30 days (typically 7-14 days) after tick bite as an expanding annular erythematous patch with central clearing ("bull's-eye" or "target" appearance), typically reaching at least 5 cm in diameter. The rash is usually at the site of the tick bite and is warm but not typically tender. Associated early symptoms include fatigue, headache, myalgias, arthralgias, and low-grade fever. Erythema migrans is a clinical diagnosis — serologic testing (ELISA followed by Western blot) is insensitive in early disease and is not recommended when the characteristic rash is present. Treatment for early localized Lyme disease is doxycycline 100 mg BID for 10-21 days (also covers potential Anaplasma co-infection), or amoxicillin if doxycycline is contraindicated.

88. A. Pityriasis rosea. Pityriasis rosea is a common, self-limited dermatosis, likely viral in etiology (associated with HHV-6 and HHV-7). The classic presentation begins with a single "herald patch" — a 2-5 cm oval, salmon-pink patch with a collarette of scale (fine scale at the periphery with central clearing) — appearing 1-2 weeks before the generalized eruption. The secondary eruption consists of smaller, similar oval patches distributed along the skin tension lines (Langer lines) of the trunk in a characteristic "Christmas tree" pattern (particularly visible on the back). Individual lesions have a collarette of scale with the free edge pointing inward. The condition is self-limited, resolving in 6-8 weeks without treatment. Secondary syphilis is the most important differential diagnosis (RPR/VDRL testing should be performed) — syphilis rash involves the palms and soles (unusual for pityriasis rosea) and does not have a herald patch. Treatment is symptomatic — topical corticosteroids and antihistamines for pruritus.

SECTION 12: EENT

89. C. Central retinal artery occlusion (CRAO). CRAO is an ophthalmologic emergency caused by acute obstruction of the central retinal artery (most commonly from embolism — carotid atherosclerotic plaque or cardiac source), resulting in sudden, painless, monocular vision loss. The retinal appearance is pathognomonic — diffuse pale, edematous retina (from ischemic necrosis of the inner retinal layers) with a cherry-red spot at the macula (the fovea appears red because the thin foveal retina allows visualization of the underlying choroidal circulation, which remains perfused). An afferent pupillary defect (Marcus Gunn pupil) is present. CRAO is analogous to an ischemic stroke of the retina — irreversible retinal damage occurs within 90-100 minutes. Emergency treatments (digital globe massage, anterior chamber paracentesis, hyperbaric oxygen) have limited evidence but are attempted in the acute window. Urgent evaluation for the embolic source (carotid ultrasound, echocardiography, cardiac monitoring) is essential because CRAO is a vascular emergency with high risk of subsequent stroke.

90. B. Acute angle-closure glaucoma. Acute angle-closure glaucoma is an ophthalmologic emergency caused by sudden obstruction of aqueous humor outflow through the trabecular meshwork due to iris bowing forward (pupillary block) and occluding the drainage angle. This produces a rapid rise in intraocular pressure (often 40-80 mmHg) causing severe eye pain, headache, nausea/vomiting, blurred vision, and halos around lights (corneal edema). The affected eye is red with a mid-dilated, fixed (non-reactive) pupil and a hazy/steamy cornea. The shallow anterior chamber in the fellow eye suggests anatomic predisposition. Risk factors include hyperopia (farsightedness — smaller eyes with crowded anterior segments), older age, female sex, and Asian ethnicity. Immediate treatment includes topical medications to lower IOP (timolol, pilocarpine, apraclonidine), systemic agents (IV acetazolamide, IV mannitol for osmotic diuresis), and definitive treatment is laser peripheral iridotomy (LPI) — creating an alternative pathway for aqueous flow. Prophylactic LPI is performed on the fellow eye.

91. D. Ménière disease. Ménière disease is an inner ear disorder caused by endolymphatic hydrops (distension of the endolymphatic space) resulting in the classic symptom tetrad — episodic vertigo (lasting 20 minutes to several hours), fluctuating sensorineural hearing loss (characteristically low-frequency initially), tinnitus (usually roaring or low-pitched), and aural fullness in the affected ear. Episodes are

recurrent with symptom-free intervals between attacks. Over time, hearing loss becomes permanent and progressive. Audiometry during or between attacks typically shows low-frequency sensorineural hearing loss. This distinguishes Ménière from BPPV (brief seconds-long positional vertigo without hearing loss), vestibular neuritis (prolonged continuous vertigo without hearing loss), and acoustic neuroma (progressive unilateral hearing loss without episodic vertigo). Treatment includes dietary sodium restriction (less than 2 g/day), diuretics (hydrochlorothiazide-triamterene), betahistine, and intratympanic corticosteroids or gentamicin for refractory cases.

92. A. Vestibular neuritis. Vestibular neuritis is an acute, self-limited peripheral vestibular disorder caused by viral inflammation of the vestibular nerve (superior division most commonly), producing sudden, severe, continuous vertigo lasting days to weeks. It typically follows a viral URI. Key features include continuous (not episodic) vertigo, horizontal nystagmus beating toward the unaffected ear (fast phase away from the lesion), positive head impulse test (corrective saccade when the head is quickly turned toward the affected ear — indicating a peripheral vestibular deficit), and absence of hearing loss or tinnitus (distinguishing it from labyrinthitis, which involves the cochlea and produces hearing loss). Normal brain MRI excludes central causes (posterior fossa stroke — which should always be considered in acute vertigo). The HINTS exam (Head Impulse, Nystagmus, Test of Skew) helps distinguish peripheral from central vertigo at the bedside. Treatment includes vestibular suppressants (meclizine, diazepam) for acute symptoms, corticosteroids, and vestibular rehabilitation.

93. C. Amoxicillin-clavulanate. Acute bacterial rhinosinusitis (ABRS) is diagnosed when URI symptoms persist for ≥10 days without improvement, when there is severe onset (high fever ≥102°F with purulent nasal discharge for 3-4 consecutive days), or when there is "double-worsening" (initial improvement followed by new-onset fever, increased nasal discharge, or facial pain/pressure). This patient meets criteria with the double-worsening pattern and 12-day symptom duration. Amoxicillin-clavulanate is the first-line antibiotic (recommended over amoxicillin alone in current guidelines due to increasing prevalence of beta-lactamase producing organisms — H. influenzae, M. catarrhalis). For penicillin-allergic patients, doxycycline or respiratory fluoroquinolones are alternatives. Treatment duration is typically 5-7 days for adults and 10-14 days for children. Adjunctive measures include nasal saline irrigation, intranasal corticosteroids, and analgesics for pain. CT sinuses are reserved for complicated cases or surgical planning, not for routine diagnosis.

94. B. Otosclerosis. Otosclerosis is a progressive disorder of abnormal bone remodeling in the otic capsule, most commonly affecting the stapes footplate in the oval window niche. Abnormal spongy bone growth progressively fixates the stapes, preventing its normal piston-like movement and impairing sound transmission to the inner ear (conductive hearing loss). It is the most common cause of conductive hearing loss in young adults with a normal-appearing tympanic membrane. Autosomal dominant inheritance with incomplete penetrance explains the family history (mother and grandmother). Weber test lateralizes to the affected (worse-hearing) ear (in conductive loss, bone conduction is enhanced relative to air conduction). Rinne test is negative on the affected side (bone conduction greater than air conduction — indicating a conductive deficit). Audiometry reveals conductive hearing loss with a characteristic "Carhart notch" (dip in bone conduction at 2000 Hz). Treatment includes hearing aids (conservative) or

stapedectomy/stapedotomy (definitive surgical treatment with excellent results — replacement of the fixed stapes with a prosthesis).

SECTION 13: INFECTIOUS DISEASE

95. D. Intravenous drug use. Right-sided infective endocarditis (particularly tricuspid valve involvement) is highly associated with IV drug use. Non-sterile injection practices introduce bacteria (predominantly S. aureus from skin flora — the most common organism in IVDU-associated IE) directly into the venous circulation, with the tricuspid valve being the first valvular structure encountered. Tricuspid valve IE causes septic pulmonary emboli (presenting as multiple bilateral pulmonary nodules, some with cavitation) rather than systemic emboli. In contrast, left-sided IE (mitral and aortic valves) is associated with underlying valvular disease (rheumatic heart disease, bicuspid aortic valve, MVP, prosthetic valves) and causes systemic emboli (stroke, splenic/renal infarcts, Janeway lesions, Osler nodes). Treatment of S. aureus tricuspid valve IE includes IV nafcillin/oxacillin or vancomycin (if MRSA) for 4-6 weeks. Surgical intervention is less commonly required for isolated right-sided IE compared to left-sided disease.

96. A. Histoplasmosis. Histoplasma capsulatum is an endemic dimorphic fungus found in soil contaminated with bird and bat droppings, concentrated in the Ohio and Mississippi River Valleys. Inhalation of microconidia (spores) causes infection ranging from asymptomatic to disseminated disease. Acute pulmonary histoplasmosis presents with fever, cough, chest pain, hilar and mediastinal lymphadenopathy, and occasionally erythema nodosum or erythema multiforme. Calcified pulmonary granulomas and splenic calcifications are seen in prior infection. Urine and serum Histoplasma antigen testing is useful for diagnosis, particularly in disseminated disease (sensitivity greater than 90%). Mild-moderate acute pulmonary histoplasmosis is self-limited and typically requires no treatment. Moderate-severe or disseminated disease is treated with amphotericin B followed by itraconazole for 12 months. Histoplasma is an intracellular pathogen (lives within macrophages), and cell-mediated immunity (T-cell response) is the primary host defense.

97. C. Neisseria meningitidis. The combination of bacterial meningitis with petechial/purpuric rash is virtually pathognomonic for meningococcal infection. N. meningitidis is a gram-negative diplococcus (kidney bean-shaped pairs) causing epidemic meningitis in adolescents and young adults, particularly in close-quarters settings (college dormitories, military barracks). The petechial rash progressing to purpura fulminans results from meningococcal septicemia (meningococcemia) with disseminated intravascular coagulation (DIC). CSF findings are classic for bacterial meningitis — elevated WBC with neutrophilic predominance, elevated protein, low glucose (CSF/serum glucose ratio less than 0.4). Empiric treatment for suspected bacterial meningitis in this age group includes IV ceftriaxone or cefotaxime plus vancomycin (to cover potentially resistant S. pneumoniae) plus dexamethasone (reduces mortality and neurologic sequelae, particularly for pneumococcal meningitis). Close contacts require chemoprophylaxis (ciprofloxacin, rifampin, or ceftriaxone). Quadrivalent meningococcal conjugate vaccine (MenACWY) is recommended for adolescents.

98. B. Cryptococcal meningitis. Cryptococcus neoformans is the most common cause of meningitis in AIDS patients with severely depressed CD4 counts (typically less than 100 cells/μL). It is an encapsulated yeast found in soil contaminated with pigeon droppings. The polysaccharide capsule inhibits phagocytosis and is the major virulence factor. CSF findings include elevated opening pressure (often markedly elevated — greater than 250 mm H2O, requiring serial therapeutic lumbar punctures for pressure management), lymphocytic pleocytosis (lower WBC counts than bacterial meningitis), elevated protein, and low glucose. India ink preparation reveals encapsulated budding yeast (visible in approximately 60-80%). CSF cryptococcal antigen (CrAg) is the most sensitive diagnostic test (sensitivity greater than 95%). Treatment follows a three-phase approach — induction (IV amphotericin B plus oral flucytosine for 2 weeks), consolidation (oral fluconazole 400 mg daily for 8 weeks), and maintenance (oral fluconazole 200 mg daily until immune reconstitution on ART with CD4 greater than 100 for 3-6 months).

99. D. Chancroid. Chancroid is a sexually transmitted genital ulcer disease caused by Haemophilus ducreyi, a gram-negative coccobacillus. The classic presentation includes one or more painful, soft, non-indurated ulcers with irregular, ragged, undermined (overhanging) borders and a purulent, necrotic base — in contrast to syphilis (painless, firm, clean-based, indurated chancre). Tender inguinal lymphadenopathy (buboes) that may become fluctuant and suppurate (drain) through the skin is characteristic. The "school of fish" pattern on Gram stain (parallel chains of gram-negative rods) is described but culture sensitivity is less than 80%. Diagnosis is often clinical (painful genital ulcer with tender lymphadenopathy, negative syphilis and HSV testing). Treatment is azithromycin 1 g single dose or ceftriaxone 250 mg IM single dose. Chancroid is a cofactor for HIV transmission and all patients should be tested for HIV. Sexual partners should be treated.

100. A. Mucormycosis (rhinocerebral zygomycosis). Mucormycosis is an aggressive, rapidly progressive, life-threatening fungal infection caused by organisms of the order Mucorales (Rhizopus, Mucor, Rhizomucor). Rhinocerebral (rhino-orbito-cerebral) mucormycosis is the most common form, occurring almost exclusively in immunocompromised patients — particularly those with poorly controlled diabetes (especially DKA), hematologic malignancies, organ transplant recipients, and patients on corticosteroids or deferoxamine. The fungus has a predilection for vascular invasion, causing thrombosis, tissue necrosis, and infarction. The black necrotic eschar on the nasal turbinate or palate is pathognomonic, resulting from vascular invasion and tissue infarction. Histopathology reveals broad, ribbon-like, non-septate (or pauciseptate) hyphae branching at wide angles (approximately 90 degrees) — distinguishing Mucorales from Aspergillus (septate hyphae with acute 45-degree branching). Treatment requires aggressive surgical debridement of necrotic tissue, IV amphotericin B (lipid formulation), and correction of underlying predisposing conditions (glycemic control, reduction of immunosuppression).