information on cardiology books, visit our website **www.jaypeebrothers.com,** for detailed information on cardiology books, visit our website **www.jaypeebrothers.com**

2556 MCQs

A Comprehensive and Authentic Question Bank in Cardiology



CARDIOLOGY MCQs

for
Postgraduate and Superspecialty Medical Entrance Examinations

Based on 20th Edition of Harrison's Principles of Internal Medicine



Prof. Ajay Mathur

CARDIOLOGY MCQs

for Postgraduate and Superspecialty Medical Entrance Examinations

Based on 20th Edition of Harrison's Prinicples of Internal Medicine

Dr Ajay Mathur
Senior Professor
Department of Medicine
SMS Medical College and Hospital
Jaipur, Rajasthan, India

Foreword
Ramesh Roop Rai

JAYPEE BROTHERS

JAYPEE BROTHERS MEDICAL PUBLISHERS
The Health Sciences Publisher
New Delhi | London | Panama

Contents

1. Dyspnea 1
2. Hypoxia and Cyanosis 5
3. Edema 8
4. Palpitations 12
5. Basic Biology of the Cardiovascular System 13
6. Electrocardiography 18
7. Principles of Electrophysiology 27
8. The Bradyarrhythmias: Disorders of the Sinoatrial Node 33
9. The Bradyarrhythmias : Disorders of the Atrioventricular Node 38
10. Approach to Supraventricular Tachyarrhythmias 44
11. Physiologic and Nonphysiologic Sinus Tachycardia 46
12. Focal Atrial Tachycardia 48
13. Paroxysmal Supraventricular Tachycardias 50
14. Common Atrial Flutter, Macroreentrant, and Multifocal Atrial Tachycardias 57
15. Atrial Fibrillation 59
16. Approach to Ventricular Arrhythmias 67
17. Premature Ventricular Beats, Non-Sustained Ventricular Tachycardia, and Idioventricular Rhythm 69
18. Sustained Ventricular Tachycardia 71
19. Polymorphic Ventricular Tachycardia and Ventricular Fibrillation 74
20. Electrical Storm and Incessant VT 79
21. Heart Failure: Pathophysiology and Diagnosis 84
22. Heart Failure: Management 90
23. Cardiomyopathy and Myocarditis 94
24. Aortic Valve Disease 111
25. Aortic Regurgitation 116

JAYPEE BROTHERS

26. Mitral Stenosis 119
27. Mitral Regurgitation 125
28. Mitral Valve Prolapse 127
29. Tricuspid Valve Disease 129
30. Pulmonic Valve Disease 131
31. Multiple and Mixed Valvular Heart Disease 132
32. Congenital Heart Disease in the Adult 133
33. Pericardial Disease 146
34. Atrial Myxoma and Other Cardiac Tumors 153
35. Non-ST-Segment Elevation Acute Coronary Syndrome (Non-ST-Segment Elevation Myocardial Infarction and Unstable Angina) 157
36. Ischemic Heart Disease 162
37. ST-Segment Elevation Myocardial Infarction 171
38. Hypertensive Vascular Disease 188
39. Renovascular Disease 204
40. Deep Venous Thrombosis and Pulmonary Thromboembolism 205
41. Diseases of the Aorta 215
42. Arterial Diseases of the Extremities 220
43. Chronic Venous Disease and Lymphedema 224
44. Pulmonary Hypertension 228

JAYPEE BROTHERS

Pulmonary Hypertension

2511. In Pulmonary hypertension (PH), mean pulmonary artery pressure is?
Harrison's 20th Ed. Chapter 277 Page 1935

A. > 16 mm Hg
B. > 18 mm Hg
C. > 20 mm Hg
D. > 22 mm Hg

Pulmonary hypertension (PH) is a spectrum of diseases involving the pulmonary vasculature and is defined as an elevation in pulmonary arterial pressures (mean pulmonary artery pressure >22 mm Hg).

2512. In Pulmonary hypertension (PH), the estimated systolic PAP is?
Harrison's 20th Ed. Chapter 277 Page 1935

A. > 28 mm Hg
B. > 32 mm Hg
C. > 36 mm Hg
D. > 40 mm Hg

In pulmonary hypertension (PH), the estimated systolic PAP is >36 mm Hg.

2513. Pulmonary arterial hypertension (PAH) is characterized by symptoms of?
Harrison's 20th Ed. Chapter 277 Page 1935

A. Dyspnea
B. Chest pain
C. Syncope
D. All of the above

Pulmonary arterial hypertension (PAH) is characterized by dyspnea, chest pain and syncope.

2514. Which of the following is the most common symptom attributable to pulmonary hypertension?
Harrison's 20th Ed. Chapter 277 Page 1936

A. Edema
B. Exertional dyspnea
C. Syncope
D. Peripheral edema

Most common symptom attributable to pulmonary hypertension is exertional dyspnea. Other symptoms are fatigue, angina pectoris (RV ischemia), syncope, near syncope & peripheral edema.

2515. Which of the following underlie the development of PAH?
Harrison's 20th Ed. Chapter 277 Page 1936

A. Vascular proliferation
B. Thrombosis
C. Inflammation
D. All of the above

Vasoconstriction, vascular proliferation, thrombosis, and inflammation underlie the development of PAH.

2516. In PH, which of the following characterize the pathological **findings in the pulmonary vasculature?**
Harrison's 20th Ed. Chapter 277 Page 1936

A. Intimal proliferation & fibrosis
B. Medial hypertrophy
C. In situ thrombosis
D. All of the above

Intimal proliferation & fibrosis, medial hypertrophy, and in situ thrombosis characterize the pathological findings in the pulmonary vasculature.

2517. In PH, with decreased compliance of pulmonary vasculature, the compensatory response is?
Harrison's 20th Ed. Chapter 277 Page 1936

A. Tachypnea
B. Tachycardia
C. Hypertension
D. All of the above

2518. Which of the following occurs in plexogenic pulmonary arteriopathy?
Harrison's 20th Ed. Chapter 277 Page 1936 Figure 277-1

A. Medial hypertrophy of muscular pulmonary arteries
B. Obstructive lesions of small muscular pulmonary arteries
C. Proliferative lesions of small muscular pulmonary arteries
D. All of the above

2519. Pathobiologic process that result in pulmonary arterial hypertension is?
Harrison's 20th Ed. Chapter 277 Page 1936

A. Inhibition of voltage-regulated potassium channel
B. Increased serotonin uptake in smooth-muscle cells
C. Hypoxia-induced activation of hypoxia-inducible factor-1α
D. All of the above

In PAH, abnormalities in molecular pathways regulating the pulmonary vascular endothelial and smooth-muscle cells include inhibition of voltage-regulated potassium channel, mutations in the bone morphogenetic protein-2 receptor, increased serotonin uptake in smooth-muscle cells due to overactivation of the serotonin transporter, hypoxia-induced activation of hypoxia-inducible factor-1α, activation of nuclear factor of activated T cells and excessive thrombin deposition related to a procoagulant state. There is a loss of apoptosis of smooth-muscle cells allowing their proliferation, and emergence of apoptosis-resistant endothelial cells which can obliterate the vascular lumen.

2520. Which of the following is the most important initial screening test for the diagnosis of PH?
Harrison's 20th Ed. Chapter 277 Page 1937

A. Doppler echocardiography
B. Echocardiogram with bubble study
C. Cardiopulmonary exercise test (CPET)
D. High-resolution computed tomography (HRCT)

An echocardiogram with bubble study is the most important initial screening test for the diagnosis of PH.

2521. Which of the following can cause PH?
Harrison's 20th Ed. Chapter 277 Page 1937

A. Valvular heart disease
B. Left ventricular systolic & diastolic function
C. Intra-cardiac shunts
D. All of the above

All forms of PH demonstrate a hypertrophied & dilated right ventricle with elevated estimated pulmonary artery systolic pressure.

JAYPEE BROTHERS

2522. Which of the following is the gold standard for diagnosis & assessment of disease severity?
Harrison's 20th Ed. Chapter 277 Page 1937

A. Doppler echocardiography
B. CT angiograms
C. Ventilation-perfusion (V/Q) scanning
D. Right heart catheterization (RHC) with pulmonary vasodilator testing

Invasive hemodynamic monitoring (right heart catheterization) is the gold standard for diagnosis & assessment of disease severity.

2523. Classic findings of PH on high-resolution computed tomography include?
Harrison's 20th Ed. Chapter 277 Page 1937

A. Enlarged pulmonary arteries
B. Peripheral pruning of small vessels
C. Enlarged right ventricle & right atrium
D. All of the above

2524. **Centrilobular ground glass infiltrate & thickened septal lines** seen in the absence of left heart disease on high-resolution CT suggest?
Harrison's 20th Ed. Chapter 277 Page 1937

A. Emphysema
B. Asthma
C. Pulmonary venous disease
D. Interstitial lung disease

2525. **Which of the following is the classic finding in PAH?**
Harrison's 20th Ed. Chapter 277 Page 1938

A. Abnormal Ventilation-perfusion (V/Q) scanning
B. Abnormal CT angiogram
C. Isolated reduction in DLCO
D. All of the above

An isolated reduction in diffusing capacity of lungs for carbon monoxide (DLCO) is a classic finding in PAH.

2526. **Which of the finding in right heart catheterization study define** precapillary PH or PAH?
Harrison's 20th Ed. Chapter 277 Page 1938

A. Increased mean PAP (mPAP >25 mm Hg)
B. Pulmonary capillary wedge pressure (PCWP) ≤15 mm Hg
C. PVR >3 Wood units
D. All of the above

An increased mean PAP (mPAP >25 mm Hg), pulmonary capillary wedge pressure (PCWP), left atrial pressure, or left ventricular enddiastolic pressure (LVEDP) ≤15 mm Hg and PVR >3 Wood units define precapillary PH or PAH in right heart catheterization (RHC) study. Post capillary PH is differentiated from precapillary PH by the PCWP being ≥15 mm Hg.

2527. In vasodilator testing, decrease in mPAP by how much is considered as a positive pulmonary vasodilator response?
Harrison's 20th Ed. Chapter 277 Page 1938

A. ≥ 3 mm Hg
B. ≥ 5 mm Hg
C. ≥ 10 mm Hg
D. ≥ 15 mm Hg

2528. Positive responders to vasodilator testing are considered for long-term treatment with?
Harrison's 20th Ed. Chapter 277 Page 1938

A. Angiotensin converting enzyme inhibitors
B. Calcium channel blockers
C. Tadalafil
D. All of the above

Short acting vasodilators like inhaled nitric oxide (NO) or inhaled epoprostenol are used for vasodilator testing. A decrease in mPAP by ≥10 mm Hg to an absolute level ≤40 mm Hg without a decrease in CO is considered as a positive pulmonary vasodilator response. Positive responders are considered for long-term treatment with calcium channel blockers (CCB).

2529. **PH due to left heart disease is classified by WHO as?**
Harrison's 20th Ed. Chapter 277 Page 1939

A. WHO Group I PH
B. WHO Group II PH
C. WHO Group III PH
D. WHO Group IV PH

WHO recognizes five categories of PH (I to V), including PAH, PH due to left heart disease, PH due to chronic lung disease, PH associated with chronic thromboemboli, and a group of miscellaneous diseases that only rarely cause PH.

2530. **Based on RHC, PAH is defined as?**
Harrison's 20th Ed. Chapter 277 Page 1939

A. Pulmonary arterial pressure (mPAP) ≥25 mm Hg
B. PVR > 240 dyne-s/cm^5
C. PCWP or LVEDP of ≤15 mm Hg
D. All of the above

Based on RHC, PAH is defined as a sustained elevation in resting mean pulmonary arterial pressure (mPAP) ≥25 mm Hg, PVR > 240 dyne-s/cm^5, and PCWP or LVEDP of ≤15 mm Hg.

2531. PAH may be associated with?
Harrison's 20th Ed. Chapter 277 Page 1939

A. HIV
B. Connective tissue disease
C. Portal hypertension
D. All of the above

PAH may be associated with HIV, connective tissue disease, and portal hypertension.

2532. Prevalence of PAH is increased in which of the following connective tissue diseases?
Harrison's 20th Ed. Chapter 277 Page 1939

A. Polymyositis
B. Systemic sclerosis
C. Sjögren's syndrome
D. All of the above

2533. Of the following collagen vascular diseases, PAH is commonest in?
Harrison's 20th Ed. Chapter 277 Page 1939

A. Systemic lupus erythematosus
B. Scleroderma
C. Rheumatoid arthritis
D. Dermatomyositis

All collagen vascular diseases may be associated with PAH. It is common with CREST syndrome & scleroderma. It is less frequent in SLE, Sjögren's syndrome, dermatomyositis, polymyositis & RA.

JAYPEE BROTHERS

2534. Prevalence of PAH is increased in?
Harrison's 20th Ed. Chapter 277 Page 1939

A. Scleroderma renal crisis
B. Limited cutaneous scleroderma
C. Diffuse cutaneous scleroderma
D. Scleromyxedema

2535. **CREST syndrome includes all except?**
Harrison's 20th Ed. Chapter 363 Page 2621

A. Calcinosis
B. Raynaud's phenomenon
C. Sclerodactyly
D. Thrombosis

CREST syndrome includes Calcinosis, Raynaud's phenomenon, Esophageal involvement, Sclerodactyly, and Telangiectasia.

2536. Portopulmonary hypertension is observed in?
Harrison's 20th Ed. Chapter 277 Page 1939

A. Primary biliary cholangitis
B. Autoimmune hepatitis
C. Hepatocellular carcinoma
D. None of the above

Portopulmonary hypertension occurs in 2 - 10% of patients with established portal hypertension. Its occurrence is independent of the cause of liver disease & is seen in patients with non-hepatic causes of portal hypertension.

2537. Which of the following is the characteristic event in portopulmonary hypertension?
Harrison's 20th Ed. Chapter 277 Page 1939

A. Medial hyperplasia
B. Intrapulmonary shunting
C. Intimal fibrosis
D. Pulmonary venous obliteration

In portopulmonary hypertension, there occurs an abnormal vasodilation of pulmonary vasculature leading to intrapulmonary shunting.

2538. WHO Group II PH includes patients with?
Harrison's 20th Ed. Chapter 277 Page 1939

A. Left heart systolic dysfunction
B. Aortic and mitral valve disease
C. Heart failure with preserved ejection fraction (HFpEF)
D. All of the above

2539. The hallmark of Group II PH is?
Harrison's 20th Ed. Chapter 277 Page 1939

A. Intrinsic pulmonary arterial disease
B. Pulmonary venous hypertension
C. Obstruction of the pulmonary vasculature
D. All of the above

The hallmark of Group II PH is elevated left atrial pressure with resulting pulmonary venous hypertension, although transpulmonary gradient and PVR remain normal.

2540. Which of the following carry a higher overall risk of PH?
Harrison's 20th Ed. Chapter 277 Page 1939

A. Left heart systolic dysfunction
B. Aortic and mitral valve disease
C. Heart failure with preserved ejection fraction (HFpEF)
D. All of the above

Studies suggest that HFpEF may carry a higher overall risk of PH.

2541. Which of the following can produce pulmonary hypertension?
Harrison's 20th Ed. Chapter 277 Page 1939

A. Portal Hypertension
B. Obstructive sleep apnea (OSA)
C. Sickle cell disease
D. All of the above

2542. **Sleep-disordered breathing is classified by WHO as?**
Harrison's 20th Ed. Chapter 277 Page 1939

A. WHO Group I PH
B. WHO Group II PH
C. WHO Group III PH
D. WHO Group IV PH

Sleep-disordered breathing is included in Group III PH.

2543. Globally, which of the following is one of the most common causes of PH?
Harrison's 20th Ed. Chapter 277 Page 1939

A. Schistosomiasis
B. Chronic thromboembolic disease
C. Left heart systolic dysfunction
D. Pulmonary arterial hypertension

Globally, schistosomiasis is one of the most common causes of PH.

2544. Which of the following is the action of Prostacyclin (PGI_2)?
Harrison's 20th Ed. Chapter 277 Page 1940

A. Vasodilation
B. Antiproliferative effects on vascular smooth muscle
C. Inhibits platelet aggregation
D. All of the above

2545. Which of the following reduces pulmonary artery pressure acutely with little effect on systemic vascular bed?
Harrison's 19th Ed. 1660

A. Inhaled nitric oxide
B. Intravenous adenosine
C. Intravenous epoprostenol
D. All of the above

Inhaled nitric oxide, IV adenosine & IV epoprostenol reduce pulmonary artery pressure acutely which is a fall in mean pulmonary artery pressure (MPAP) >=10 mm Hg & a final MPAP <40 mm Hg.

2546. Conventional therapy for pulmonary arterial hypertension includes?
Harrison's 19th Ed. Page 1660

A. Anticoagulation
B. Diuretics

JAYPEE BROTHERS

C. Calcium channel blockers
D. All of the above

Anticoagulant therapy is advocated for all patients with PAH as warfarin increases survival of patients with PAH. Diuretic therapy relieves peripheral edema & reduces RV volume overload in presence of tricuspid regurgitation. Patients who have substantial reductions in pulmonary arterial pressure in response to short-acting vasodilators at the time of cardiac catheterization should be treated initially with calcium channel blockers.

2547. Phosphodiesterase-5 is responsible for the hydrolysis of which of the following in pulmonary vascular smooth muscle?
Harrison's 20th Ed. Chapter 277 Page 1940

A. Cyclic GMP
B. Cyclic AMP
C. Endothelin-1
D. Inositol 1,4,5-trisphosphate (IP_3)

Phosphodiesterase-5 (PDE-5) is responsible for the hydrolysis of cyclic 3',5'-guanosine monophosphate (cyclic GMP) in pulmonary vascular smooth muscle which induces relaxation of smooth muscle. Inhibitors of PDE-5 such as sildenafil, vardenafil, and tadalafil reduce the breakdown of cyclic GMP. Nitric oxide increases the production of cyclic GMP.

2548. Which of the following prostacyclins is used for treatment of PAH?
Harrison's 20th Ed. Chapter 277 Page 1940

A. Iloprost
B. Epoprostenol
C. Treprostinil
D. All of the above

2549. **Which of the following is an 'Endothelin Receptor Antagonist'** used in the treatment of pulmonary arterial hypertension?
Harrison's 20th Ed. Chapter 277 Page 1940

A. Epoprostenol
B. Treprostinil
C. Bosentan
D. Sildenafil

Endothelin receptor antagonists bosentan and ambrisentan are approved for treatment of PAH. Liver functions must be monitored monthly throughout the duration of use. Bosentan is contraindicated in patients who are on cyclosporine or glyburide concurrently. Sildenafil is a phosphodiesterase-5 inhibitor. Treprostinil is an analogue of epoprostenol.

2550. Which of the following is an ET receptor antagonist?
Harrison's 20th Ed. Chapter 277 Page 1940

A. Ambrisentan
B. Bosentan
C. Macitentan
D. All of the above

Ambrisentan is a selective ET-A receptor antagonist while Bosentan and Macitentan are non-selective ET receptor antagonists.

2551. **Selexipag best relates to?**
Harrison's 20th Ed. Chapter 277 Page 1940

A. Prostaglandin I_2 (IP) receptor
B. Endothelin-1 (ET-1) receptor
C. β2-receptor
D. Adenosine A_1-receptor

Selexipag is an oral nonprostanoid diphenylpyrazine derived selective IP prostacyclin receptor agonist that binds the prostaglandin I2 (IP) receptor.

2552. Which of the following about Nitric oxide (NO) is false?
Harrison's 20th Ed. Chapter 277 Page 1940

A. Derives from endothelial cells
B. Activate guanylyl cyclase to generates cGMP
C. Induces vasodilation, inhibits platelet activation
D. None of the above

2553. Phosphodiesterase type 5 enzymes metabolize?
Harrison's 20th Ed. Chapter 277 Page 1940

A. cGMP
B. cAMP
C. CREB
D. All of the above

Nitric oxide (NO) derived from endothelial cells activate guanylyl cyclase that generates cGMP in vascular smooth muscle cells & platelets. cGMP induces vasodilation through relaxation of arterial smooth muscle cells & inhibits platelet activation. Phosphodiesterase-5 (PDE5) inhibitors increase cyclic guanosine monophosphate (cGMP) levels.

2554. **Riociguate increases the production of?**
Harrison's 20th Ed. Chapter 277 Page 1940

A. Prostacyclin (PGI_2)
B. Nitric oxide
C. Endothelin
D. All of the above

Riociguat is a soluble guanylyl cyclase stimulator acting synergistically with endogenous NO, and also directly stimulating soluble guanylyl cyclase independent of NO availability. Riociugat acts by increasing the production of nitric oxide.

2555. Which of the following best relates to familial pulmonary arterial hypertension?
Harrison's 20th Ed. Chapter 476 Page 3517

A. Tumor necrosis factor (TNF) receptor superfamily
B. Serine protease inhibitor (serpin) superfamily
C. Transforming growth factor β (TGF-β) superfamily
D. GPCR superfamily

2556. Which of the following is a member of transforming growth **factor β (TGF-β) superfamily?**
Harrison's 20th Ed. Chapter 476 Page 3517-8

A. Bone morphogenetic protein receptor-2 (BMPR-2)
B. Activin receptor-like kinase-1 (Alk-1)
C. Endoglin
D. All of the above

JAYPEE BROTHERS

for detailed information on cardiology books, visit our website **www.jaypeebrothers.com,** for detailed information on cardiology books, visit our website **www.jaypeebr**

CARDIOLOGY MCQs



Ajay Mathur works as Senior Professor of Medicine at SMS Medical College and Hospital, Jaipur.

Gold Medal recipient at undergraduate and postgraduate levels, Dr Mathur has keen academic interests. This book is an outcome of his passion for medical science and research spanning over the last three decades.

In keeping with the shift in medical pedagogies and intense competition that professional face today, he embarked upon this academic exercise in the year 2007. His books help medical professionals keep abreast with the latest and greatest trends in medicine while also revering the glorious age-old traditions of clinical methods.

Adding yet another edition to his body of work, Dr Mathur gleans great satisfaction from enabling medical students to pursue excellence in their education and becoming responsible professionals of tomorrow. In his latest undertaking, he adjusts his approach to tackle medical education, one specialism at a time. This allows students to delve deeper into the subject of their choice.

Available at all medical bookstores
or buy online at www.jaypeebrothers.com

JAYPEE BROTHERS
Medical Publishers (P) Ltd.
www.jaypeebrothers.com
Join us on facebook.com/JaypeeMedicalPublishers

Shelving Recommendation
CARDIOLOGY

ISBN 978-93-89129-99-1
9 789389 129991