

MULTIPLE CHOICE

ECHO - MIXED EXAM

PROPOSED FOR REVIEW - questions are the author's verbatim Q&A; distractors are auto-selected from other answers in the same bank and must be checked by a subject-matter reviewer (a distractor could coincidentally be correct). Not authoritative assessment content.

1. Which chamber typically appears most posterior on a parasternal long-axis echocardiographic view, lying just anterior to the descending thoracic aorta?

- A. Right ventricle
- B. Left atrium
- C. Right atrium
- D. Left ventricle

2. Which Doppler finding supports the diagnosis of cardiac tamponade?

- A. Reduced respiratory variation in mitral and tricuspid inflow
- B. Persistent diastolic forward flow in the pulmonary artery
- C. Exaggerated respiratory variation in mitral and tricuspid inflow velocities
- D. Holosystolic flow reversal in the hepatic veins

3. The suprasternal notch long-axis view is primarily used to evaluate which structure?

- A. Left ventricular apex
- B. Aortic arch and descending thoracic aorta
- C. Pulmonary veins entering the left atrium
- D. Coronary sinus

4. A normally functioning bileaflet mechanical aortic prosthesis is expected to have what type of forward flow pattern by spectral Doppler?

- A. Peak velocity less than 1 m/s identical to a normal native aortic valve
- B. Slightly elevated peak velocity, typically 2 to 3 m/s, with a brief acceleration
- C. Peak velocity greater than 5 m/s indicating obstruction in all patients
- D. A continuous diastolic flow pattern with no systolic peak

5. Which imaging modality is preferred for evaluating suspected prosthetic mitral valve dysfunction or paravalvular leak?

- A. Transesophageal echocardiography
- B. M-mode of the mitral prosthesis
- C. Contrast-enhanced transthoracic echo with agitated saline
- D. Transthoracic echocardiography from the apical 4-chamber view alone

6. Cardiac output is best defined as which of the following?

- A. End-diastolic volume multiplied by heart rate
- B. Stroke volume divided by heart rate
- C. Ejection fraction multiplied by heart rate
- D. Stroke volume multiplied by heart rate

7. Which two-dimensional echocardiographic finding is most suggestive of pulmonary hypertension and right ventricular pressure overload?

- A. Flattening of the interventricular septum only in early diastole
- B. Flattening of the interventricular septum in systole producing a D-shaped left ventricle in short axis
- C. Concentric left ventricular hypertrophy with small chamber size
- D. Left atrial enlargement with normal right heart chambers

8. Which feature most reliably identifies the morphologic right ventricle on echocardiography?

- A. Presence of a moderator band and more apically displaced atrioventricular valve
- B. Direct connection to the pulmonary veins

- C. Two papillary muscles and smooth interventricular surface
- D. Smooth-walled chamber with thicker free wall than the systemic ventricle

9. In hypertrophic obstructive cardiomyopathy, systolic anterior motion (SAM) of the mitral valve produces which associated finding?

- A. Mitral stenosis with diastolic doming
- B. Mitral regurgitation directed posteriorly
- C. Mitral regurgitation directed anteriorly
- D. Aortic regurgitation with reverse doming

10. Acoustic shadowing on transthoracic echocardiography of a mechanical prosthetic mitral valve most commonly obscures which structure?

- A. The aortic valve leaflets
- B. The right ventricular outflow tract
- C. The left atrium during evaluation for paravalvular regurgitation
- D. The descending thoracic aorta

11. The shunt ratio Q_p/Q_s is calculated by:

- A. Dividing pulmonary peak velocity by aortic peak velocity
- B. Dividing pulmonary stroke volume by systemic stroke volume
- C. Dividing right atrial pressure by left atrial pressure
- D. Dividing aortic VTI by mitral VTI

12. Pulmonary regurgitation end-diastolic velocity is used to estimate which pressure?

- A. Pulmonary artery end-diastolic pressure
- B. Pulmonary artery systolic pressure
- C. Left ventricular end-diastolic pressure
- D. Mean right atrial pressure

13. Which continuous-wave Doppler peak velocity across the aortic valve is most consistent with severe aortic stenosis?

- A. 2.0 to 2.9 m/s
- B. 3.0 to 3.9 m/s
- C. Less than 2.0 m/s
- D. Greater than 4.0 m/s

14. Which mitral inflow pattern is most consistent with impaired LV relaxation (grade I diastolic dysfunction)?

- A. E/A ratio less than 0.8 with prolonged deceleration time
- B. Fused E and A waves at fast heart rates
- C. E/A ratio between 0.8 and 1.5 with normal deceleration time
- D. E/A ratio greater than 2 with short deceleration time

15. Which echocardiographic finding suggests perivalvular extension of infection in aortic valve endocarditis?

- A. Trace mitral regurgitation
- B. An echolucent space adjacent to the aortic root consistent with a perivalvular abscess
- C. A small central aortic regurgitation jet
- D. Mild concentric LV hypertrophy

16. Bicuspid aortic valve is most commonly associated with which of the following aortic abnormalities?

- A. Aortic arch hypoplasia at the isthmus only
- B. Dilation of the abdominal aorta below the renals
- C. Aortic root and ascending aorta dilation (aortopathy)
- D. Saccular aneurysm of the descending thoracic aorta

17. How many papillary muscles are typically present in the normal left ventricle?

- A. Three
- B. Two
- C. One
- D. Four

18. Which Doppler measurement is the foundation of nearly all volumetric flow calculations in echocardiography (stroke volume, cardiac output, continuity equation, Q_p/Q_s)?

- A. Deceleration time
- B. Velocity-time integral (VTI)
- C. Pressure half-time
- D. Peak instantaneous velocity

19. The left anterior descending coronary artery primarily supplies which region of the left ventricle?

- A. Inferior wall and posterior septum
- B. Lateral wall
- C. Right ventricular free wall
- D. Anterior wall and anterior interventricular septum

20. From which view is the inferior vena cava diameter and respiratory variation routinely measured for right atrial pressure estimation?

- A. Subcostal long-axis view
- B. Suprasternal notch view
- C. Apical four-chamber view
- D. Parasternal short-axis view

21. Adding anterior angulation to the apical four-chamber view to bring the left ventricular outflow tract and aortic valve into the image creates which view?

- A. Apical five-chamber view
- B. Subcostal four-chamber view
- C. Apical two-chamber view
- D. Apical three-chamber (apical long-axis) view

22. Tissue Doppler imaging of the mitral annulus is primarily used to evaluate which property?

- A. Aortic valve gradient
- B. Pulmonary vein flow direction
- C. High-velocity transmitral blood flow
- D. Myocardial relaxation and longitudinal motion

23. A mosaic, multicolored pattern in a color Doppler jet most commonly indicates which finding?

- A. Absence of flow
- B. Turbulent, high-velocity flow with aliasing
- C. Tissue motion artifact
- D. Laminar flow at normal velocity

24. Pulsus paradoxus, defined as an exaggerated inspiratory drop in systemic systolic pressure, is most closely associated with which condition?

- A. Restrictive cardiomyopathy
- B. Cardiac tamponade
- C. Constrictive pericarditis
- D. Hypertrophic cardiomyopathy

25. Which of the following is the approximate upper limit of normal for LV internal diameter at end-diastole (LVIDd) indexed appropriately, in an average-sized adult male measured from PLAX?

- A. 5.8 cm
- B. 6.8 cm
- C. 3.5 cm
- D. 7.5 cm

26. Small, narrow regurgitant jets seen within the sewing ring of a mechanical bileaflet aortic prosthesis on color Doppler most likely represent which finding?

- A. Prosthetic endocarditis with leaflet destruction
- B. Normal built-in closing or washing jets of the prosthesis
- C. Paravalvular leak that requires reoperation
- D. Pannus ingrowth into the prosthesis

27. Which cardiac chamber has the thickest myocardial wall in a normal adult heart?

- A. Right atrium
- B. Left ventricle
- C. Right ventricle
- D. Left atrium

28. An aortic regurgitation jet width-to-LVOT width ratio greater than 65 percent on color Doppler in the parasternal long-axis view most likely indicates which severity?

- A. Moderate
- B. Severe
- C. Mild
- D. Trace

29. Stroke volume across the LVOT is calculated using which equation?

- A. Stroke volume equals LVOT area divided by LVOT VTI
- B. Stroke volume equals LVOT VTI times heart rate
- C. Stroke volume equals LVOT cross-sectional area times LVOT VTI
- D. Stroke volume equals LVOT diameter times LVOT peak velocity

30. Which condition makes the Teichholz (M-mode) method of estimating left ventricular ejection fraction unreliable?

- A. Mild concentric LV hypertrophy with normal wall motion
- B. Mild mitral annular calcification
- C. Sinus tachycardia at 110 beats per minute
- D. Regional wall motion abnormalities such as those after a myocardial infarction

31. On color Doppler, a mitral regurgitation jet that is eccentric and directed away from the prolapsing leaflet most likely indicates which mechanism?

- A. Restricted motion of both leaflets due to ischemia
- B. Symmetric annular dilation
- C. Systolic anterior motion of the anterior leaflet
- D. Prolapse or flail of the leaflet opposite the jet direction

32. Which view is best suited for measuring the tricuspid annular plane systolic excursion (TAPSE) by M-mode?

- A. Subcostal four-chamber with the cursor through the septal annulus
- B. Parasternal short-axis at the aortic-valve level
- C. Parasternal long-axis with the cursor through the tricuspid valve
- D. Apical four-chamber view with the M-mode cursor through the lateral tricuspid annulus

33. Where is a left atrial myxoma most commonly attached?

- A. Posterior mitral annulus
- B. Left atrial appendage tip
- C. Interatrial septum at the fossa ovalis
- D. Lateral wall of the left atrium

34. Which morphologic finding is most suggestive of chronic constrictive pericarditis?

- A. Echo-dense mass within the left ventricular apex
- B. Thickened and brightly echogenic pericardium
- C. Bright endocardial speckling of the left ventricle
- D. Discrete pedunculated mass attached to the atrial septum

35. Which physiologic change most directly increases left ventricular afterload?

- A. A decrease in heart rate
- B. An increase in myocardial contractility
- C. An increase in systemic vascular resistance
- D. An increase in venous return

36. Which Doppler modality is limited by aliasing when interrogating high velocities?

- A. Pulsed-wave Doppler
- B. B-mode
- C. M-mode
- D. Continuous-wave Doppler

37. In the parasternal short-axis view at the mitral valve level, the anterior leaflet appears as which feature during diastole?

- A. A fish-mouth opening anterior to the smaller posterior leaflet
- B. An immobile linear echogenicity in the LA
- C. A single thin echo posterior to the aortic root
- D. A coaptation line perpendicular to the septum

38. From which sinus of Valsalva does the left main coronary artery normally arise?

- A. Non-coronary sinus
- B. Left coronary sinus
- C. Right coronary sinus
- D. Posterior sinus

39. In most patients, the posterior descending artery (PDA) arises from which vessel, defining right coronary dominance?

- A. Left main coronary artery
- B. Left anterior descending artery
- C. Left circumflex artery
- D. Right coronary artery

40. Which window is preferred for visualizing the right ventricular outflow tract and pulmonic valve in adults?

- A. Apical three-chamber view
- B. Parasternal short-axis at the level of the aortic valve
- C. Apical two-chamber view
- D. Suprasternal long-axis view

41. Left ventricular thrombus is most commonly seen in association with which finding?

- A. Isolated right ventricular infarction
- B. Hyperdynamic basal lateral wall with normal apex
- C. Akinetic or dyskinetic apical segment after anterior myocardial infarction
- D. Concentric left ventricular hypertrophy with preserved function

42. How many cusps does a normal aortic valve have?

- A. Three
- B. One
- C. Four
- D. Two

43. Which view is preferred for measuring tricuspid regurgitation peak velocity to estimate pulmonary artery systolic pressure?

- A. Parasternal long-axis with pulsed-wave Doppler
- B. Suprasternal notch with continuous-wave Doppler
- C. Subcostal short-axis with color M-mode
- D. Apical four-chamber (or RV-focused) view with continuous-wave Doppler

44. On color Doppler, which vena contracta width is most consistent with severe aortic regurgitation?

- A. Less than 3 mm
- B. 3 to 4 mm
- C. Greater than 6 mm
- D. 4 to 6 mm

45. Which Doppler finding in the descending aorta below the diaphragm is most suggestive of significant aortic coarctation?

- A. Continuous antegrade diastolic flow with delayed upstroke (loss of normal early diastolic flow reversal)
- B. Holodiastolic flow reversal
- C. Triphasic flow with prominent reverse diastolic component
- D. Sharp systolic upstroke with brisk early diastolic flow reversal

46. Color Doppler displays moving blood by which property?

- A. Mean velocity and direction within each pixel, encoded as color
- B. Tissue motion velocity within each pixel
- C. Signal amplitude without directional information
- D. Peak velocity along the entire beam, encoded as a spectral trace

47. Which PISA-derived effective regurgitant orifice area is most consistent with severe primary mitral regurgitation?

- A. 0.20 to 0.39 cm squared
- B. Greater than or equal to 0.40 cm squared
- C. 0.10 to 0.19 cm squared
- D. Less than 0.10 cm squared

48. An IVC of 1.5 cm that collapses more than 50 percent with sniff corresponds to which estimated right atrial pressure category?

- A. Normal (approximately 3 mmHg)
- B. Intermediate (approximately 8 mmHg)
- C. High (approximately 15 mmHg)
- D. Markedly high (greater than 20 mmHg)

49. A segment that bulges outward during systole rather than thickening inward is described as:

- A. Hypokinetic
- B. Akinetic
- C. Dyskinetic
- D. Hyperkinetic

50. Which echocardiographic feature defines Ebstein anomaly?

- A. Subvalvular pulmonary stenosis with infundibular hypertrophy
- B. Cleft in the anterior mitral leaflet with primum ASD
- C. Apical displacement of the septal tricuspid leaflet with atrialization of the right ventricle
- D. Apical displacement of the anterior mitral leaflet with atrialization of the left ventricle