MULTIPLE CHOICE

AE VALVULAR DISEASE - PRACTICE SET - ANSWER KEY

1. In low-flow, low-gradient aortic stenosis with reduced ejection fraction, which test is used to distinguish true severe AS from pseudo-severe AS?

A. Exercise treadmill echocardiography
B. Contrast-enhanced echocardiography at rest
C. Low-dose dobutamine stress echocardiography
D. Transesophageal echocardiography with agitated saline

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

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

3. A young adult with aortic stenosis is found to have two leaflets with a single raphe. What is the most likely diagnosis?

A. Unicuspid aortic valve
B. Bicuspid aortic valve
C. Quadricuspid aortic valve
D. Rheumatic aortic valve

4. A planimetered mitral valve area of 0.9 cm squared in a patient with rheumatic mitral stenosis is consistent with which severity?

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

5. What is the expected chronic left ventricular response to severe aortic stenosis?

A. Concentric left ventricular hypertrophy
B. Right ventricular hypertrophy
C. Left ventricular wall thinning
D. Eccentric left ventricular hypertrophy with dilation

6. 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. Pannus ingrowth into the prosthesis
D. Paravalvular leak that requires reoperation

7. Estimation of mean pulmonary artery pressure using the pulmonic regurgitation jet uses which Doppler measurement?

A. Peak early-diastolic PR velocity
B. Peak systolic pulmonic forward flow velocity
C. Pulmonic valve acceleration time alone
D. End-diastolic PR velocity

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

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

9. Right atrial pressure is estimated by echocardiography primarily from which finding?

A. Inferior vena cava diameter and its collapse with inspiration (sniff)
B. Hepatic vein systolic-to-diastolic flow ratio alone
C. Pulmonary artery acceleration time
D. Tricuspid regurgitation peak velocity

10. 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. Trace
C. Mild
D. Severe

11. Pressure recovery distal to a stenotic aortic valve causes Doppler to do which of the following?

A. Underestimate the true transvalvular gradient
B. Overestimate the true transvalvular gradient compared with cardiac catheterization
C. Have no effect on the measured gradient
D. Eliminate the transvalvular pressure gradient entirely

12. Which finding distinguishes rheumatic mitral stenosis from degenerative (calcific) mitral annular disease with severe annular calcification?

A. Commissural fusion with leaflet tip thickening and doming in rheumatic disease
B. Calcification limited to the chordae tendineae in rheumatic disease
C. Annular calcification only, with normal leaflet motion in rheumatic disease
D. Restricted posterior leaflet without commissural involvement in rheumatic disease

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

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

14. In hypertrophic obstructive cardiomyopathy, the mitral regurgitation jet associated with systolic anterior motion is most often directed in which direction?

A. Centrally with a symmetric round jet
B. Anteromedially toward the interatrial septum
C. Posteriorly and laterally into the left atrium
D. Into the LVOT toward the aorta

15. On which side of the valve do endocarditis vegetations characteristically form?

A. The high-pressure (downstream) side of the valve
B. The low-pressure (upstream) side relative to the high-velocity jet
C. Only on the annulus
D. Only on the chordal apparatus

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

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

17. Prosthesis-patient mismatch is best described by which definition?

A. Paravalvular leak around the sewing ring
B. Thrombus formation on the prosthetic leaflets
C. Structural failure of the leaflets of the prosthesis

D. The effective orifice area of the prosthesis is too small for the patient's body size, producing high gradients despite normal prosthesis function

18. Which combination of valve lesions is most characteristic of chronic rheumatic heart disease?

A. Mitral stenosis with mitral and aortic regurgitation
B. Isolated bicuspid aortic stenosis
C. Isolated tricuspid regurgitation
D. Isolated pulmonic stenosis

19. What is the most common cause of aortic stenosis in adults over the age of 70?

A. Infective endocarditis with leaflet thickening
B. Calcific degeneration of a trileaflet aortic valve
C. Rheumatic heart disease
D. Bicuspid aortic valve calcification

20. In secondary (functional) mitral regurgitation due to ischemic cardiomyopathy, the most common mechanism is which of the following?

A. Chordal rupture with flail leaflet
B. Primary leaflet myxomatous degeneration
C. Leaflet tethering from displacement of the papillary muscles with annular dilation
D. Vegetations on the leaflet tips

21. Rheumatic mitral stenosis classically shows which leaflet motion abnormality on 2D echocardiography?

A. Systolic anterior motion of the anterior mitral leaflet
B. Diastolic doming or hockey-stick appearance of the anterior mitral leaflet
C. Mid-systolic posterior displacement of the posterior leaflet
D. Flail anterior leaflet with chordal rupture

22. True or false: In chronic severe aortic regurgitation, an LV end-systolic dimension greater than 50 mm is an indication to consider aortic valve surgery even in asymptomatic patients.

A. False
B. True

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

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

24. Which echocardiographic finding is most characteristic of mitral valve prolapse on 2D imaging?

A. Systolic displacement of one or both mitral leaflets greater than 2 mm above the mitral annular plane in the parasternal long-axis view
B. Systolic anterior motion of the anterior mitral leaflet contacting the septum
C. Restricted posterior leaflet motion with tethering
D. Diastolic doming of the anterior mitral leaflet

25. Which equation is used to estimate the aortic valve area in aortic stenosis from Doppler echocardiography?

A. Continuity equation
B. Pressure half-time equation
C. Bernoulli equation
D. PISA (proximal isovelocity surface area) equation