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MCC-002

POST GRADUATE DIPLOMA IN CLINICAL CARDIOLOGY (PGDCC)

Term-End Examination

December, 2012

MCC- 002 : FUNDAMENTALS OF CARDIOVASCULAR SYSTEM - II

Time : 2 hours *Maximum Marks : 60*

Note :

(i) *There will be multiple choice type of questions in this examination which are to be answered in* ***OMR Answer Sheets.***

(ii) *All questions are* ***compulsory.***

(iii) *Each question will have four options and only* ***one*** *of them is correct. Answers have to be marked in figures in the appropriate rectangular boxes corresponding to what is the correct answer and then blacken the circle for the same number in that column by using HB or lead pencil and not by ball pen* ***in OMR Answer Sheets.***

(iv) *If any candidate marks more than one option, it will be taken as the wrong answer and no marks will be awarded for this.*

(v) *There will be 90 questions in this paper and each question carries equal marks.*

(vi) *There will be no negative marking for wrong answers.*

(vii) *No candidate shall leave the examination hall at least for one hour after the commencement of the examination.*

1. Which of the following frequency of echo probe is used in paediatric population ?
(1) 1-2 MHz (2) 7.5-10 kHz (3) 5 MHz (4) 7.5-10 MHz

2. Which of the following echocardiographic probes has the best resolution ?
(1) 10 MHz (2) 7.5 MHz (3) 2 MHz (4) 5 MHz

3. M-mode echocardiographic examination is used for assessment of all of the following except :
(1) Chamber dimensions (2) Wall thickness
(3) Endocardial motion (4) Left and right ventricular diastolic function

4. All of the following are visualised in partasternal long axis view except :
(1) RCC (2) NCC (3) PMVL (4) LCC

5. What is PRF in pulse wave Doppler echocardiography ?
(1) Pulse related frequency (2) Pulse repetition frequency
(3) Pulse related flow (4) Pulse repetition flow

6. The peak velocity measured in ascending aorta is 4m/sec and peak velocity measured in LVOT is 2m/sec. Which of the following is the pressure gradient across the aortic valve ?
(1) 40 (2) 52 (3) 48 (4) 64

7. In which of the following condition is Mc conells sign present on echocardiography ?
(1) Pulmonary embolism (2) Coarctation of aorta
(3) Coronary arteriovenous fistula (4) Pericardial tamponade

8. A patient is suspected to have diastolic dysfunction and mitral flow velocities were recorded. Which of the following observation is not correct ?
(1) In restrictive filling pattern, IVRT is < 70 msec.
(2) In pseudonormalization pattern, DT is 160-200 msec.
(3) In restrictive filling pattern, mitral A duration > pva duration.
(4) In normal filling pattern, mitral A duration > pva duration.

9. On M-mode echocardiography the following measurements were obtained on PLAX view: LVED - 62 mm, LVES-54 mm. Calculate the ejection fraction.
(1) 35% (2) 25% (3) 40% (4) 50%

10. A 2 month old baby presented with feeding difficulty, cough and respiratory distress. ECG showed anterior wall M.I pattern. 2D-Echo showed severe LV dysfunction. In which of the following echo views is the condition best diagnosed ?
(1) Apical 4 chamber view (2) Parasternal long axis view
(3) Parasternal short axis view (4) Suprasternal view

11. Above what value is pericardium considered as thickened ?
(1) 2 mm (2) 4 mm (3) 6 mm (4) 8 mm

12. A 50 year old man presented to the emergency with sudden onset of breathlessness and chest pain. On examination, jvp was raised and pulsus paradoxus was present. Patient was a known case of bronchogenic carcinoma. Which of the following is the imaging modality of choice presently ?
(1) MRI (2) C.T THORAX
(3) 2D-ECHO (4) RADIONUCLIDE SCAN

13. A 54 year old female presented to the emergency with history of acute onset of chest pain since 3 hours. ECG showed horizontal ST depression of 6 mm in V1-V3 with upright hyperacute T waves. Troponin was positive. Which wall of LV is involved and which is the corresponding view to look for the RWMA.
(1) Anterior wall - PSAX view (2) Posterior wall - apical 4 chamber view
(3) Posterior wall - PSAX view (4) Inferior wall - apical 2 chamber view

14. All of the following are echocardiographic findings of cardiac tamponade except :
(1) Exaggerated respiratory variation with > 25% at mitral position and > 40% at tricuspid position.
(2) Increased expiratory flow reversal in hepatic vein.
(3) Inspiratory decrease and expiratory increase in pulmonary vein diastolic forward flow.
(4) Inspiratory increase and expiratory decrease in pulmonary vein diastolic forward flow.

15. All of the following are echocardiographic features of mitral stenosis except :
(1) Increased transmitral pressure gradient.
(2) Fish mouth orifice in short axis view.
(3) Increased EF slope.
(4) Decreased EF slope.

16. The features of severe mitral stenosis on echocardiography are all of the following except:
(1) MVA by planimetry of $< 1.0\ cm^2$:
(2) PHT of > 220 ms.
(3) Resting mean gradient of > 10 mm Hg.
(4) PHT of < 220 ms.

17. In an adult, the normal tricuspid valve area is :
(1) 6 - 9 cm^2 (2) 5 - 7 cm^2 (3) 10 - 12 cm^2 (4) 3 - 4 cm^2

18. A 36 year old lady was diagnosed to be a case of rheumatic mitral stenosis. On 2D-Echo, the Wilkins score was 7. The ideal treatment modality is :
(1) MV repair (2) MVR
(3) Medical management (4) BMV

19. A 25 year old man presented with V.T. It was reverted with D.C. shock. Patient had similar episodes of V.T. before ECG showed epsilon waves. What is the investigative modality of choice in this patient ?
(1) 2D-Echo (2) CT SCAN (3) Cardiac MRI (4) SPECT SCAN

20. Above what value is the late or holosystolic bowing of mitral valve leaflets above the plane of mitral annulus in PLAX view on M - mode echo is indicative of MVP ?

(1) 2 mm (2) 1.5 mm (3) 3 mm (4) 4 mm

21. A 22 year old boy presented with history of fatigue and breathlessness since 2 years. Echocardiography revealed severe M.R. All of the following are echocardiographic criteria of severe M.R except :

(1) Vena contracta > 6 mm.

(2) M.R. regurgitation volume of > 50 ml.

(3) Effective regurgitation orifice > 4 cm^2.

(4) M.R. jet area > 8 cm^2.

22. A patient undergoes echocardiographic examination to assess the severity of AR. Which of the following data suggests severe AR.

(1) Regurgitation width/LVOT diameter > 60%.

(2) Regurgitant fraction > 60%.

(3) Regurgitant volume > 55 ml.

(4) All of the above.

23. All of the following are criteria for diagnosing severe TR on echocardiography except :

(1) Annular dilatation > 4 cm.

(2) Colour flow regurgitant jet area > 30% of RA area.

(3) Holodiastolic flow reversal in hepatic veins.

(4) Cuspal non - coaptation.

24. Maximum velocity recorded with Doppler in normal individuals at aorta is :

(1) 1.5 (2) 1.2 (3) 1.0 (4) 1.35

25. All of the following are morphological features of right ventricle on echocardiography except :

(1) Infundibulum (2) Coarse septal surface

(3) Moderator band (4) Fine apical trabeculations

26. A 50 year man presented with breathlessness, chest pain, cough and swelling of abdomen and feet. Patient had history of pulmonary TB 4 YRS back. On examination ascites was out of proportion to pedal edema. Also there was raised JVP. All of the following are diagnostic features on echo except :

(1) Mild atrial enlargement with normal LV size.

(2) Premature opening of pulmonary valve.

(3) Reduced diastolic flow reversal with expiration in hepatic veins.

(4) Flattening of LV endocardial motion in mid and late systole.

27. A 48 yr old lady presented with sudden onset of tearing chest pain radiating to back. Patient was a known hypertensive (uncontrolled). On examination B.P. was 230/126 mm Hg and there was early diastolic murmur in neoaortic area. Which of the following is the imaging modality of choice in this patient ?
(1) TTE
(2) Coronary angiography
(3) PET Scan
(4) CT Scan

28. Which of the following position of the VSD with respect to the type of VSD in PSAX view on echo is false ?
(1) 12 'O' clock - subaortic VSD
(2) 3 'O' clock - subpulmonic VSD
(3) 2 'O' clock - perimembranous VSD
(4) 1 'O' clock - subaortic VSD

29. A 10 old boy was found to have a VSD with mod PAH on 2D-Echo. Which position of VSD is suitable for VSD device closure ?
(1) Subaortic VSD
(2) Subpulmonic VSD
(3) Perimembranous VSD
(4) Inlet VSD

30. PAPVC of right superior pulmonary vein is usually associated with which type of ASD ?
(1) Coronary sinus type of ASD
(2) Ostium secundum ASD
(3) Sinus venosus ASD - IVC type
(4) Sinus venosus ASD - SVC type

31. A 30 yr old athlete presented with history of dyspnea since 2 yrs. Patient's brother had died at the age of 24 yrs due to sudden cardiac death. On examination there was LV S4 and systolic murmur at the mitral area. ECG showed LV hypertrophy and deep broad Q waves. Which of the following are features on echo in this case ?
(1) Systolic anterior motion of AMVL
(2) IVS/P.W. thickness ratio > 1.3
(3) Mitral regurgitation
(4) All of the above

32. A 30 yr old lady presented with sudden onset of breathlessness and chest pain. ECG showed sinus tachycardia, right axis deviation and RBBB. Echo showed dilated RA, RV, Moderate TR and RVSP of 54 mm Hg. Which of the following is the investigative modality of choice in this patient ?
(1) M.R. Angiography
(2) Ventilation perfusion scanning
(3) Conventional pulmonary angiography
(4) C.T.- pulmonary angiography

33. The normal range of calibre of Left anterior descending coronary artery is :
(1) 3.7 +/- 0.4 mm
(2) 2.8 +/- 0.5 mm
(3) 5.6 +/-0.5 mm
(4) 2.0 +/- 0.8 mm

34. What percent reduction in diameter of lumen of coronary artery is haemodynamically significant ?
(1) 50% (2) 60% (3) 70% (4) 80%

35. A 50 yr old man presented with history of chest pain since 2 days. ECG showed anterior wall M.I. with LBBB. ECHO showed an EF of 30% and akinetic apical septum, apex and anterior wall. Coronary angiography showed proximal LAD occlusion of 100%. Which of the following is the best management approach ?
(1) PTCA with stenting to LAD
(2) Medical management
(3) Myocardial perfusion scanning using stress thalium test followed by revascularisation if LAD Territory is viable
(4) CABG

36. What percent of normal individuals have a balanced co-dominant coronary circulation ?
(1) 15% (2) 80% (3) 7% (4) 25%

37. The catheter angiography technique was first proposed by :
(1) Abrahams (2) Reynold
(3) Bernoulli (4) Dotter and Judkins

38. Obtuse marginal artery is a branch of which of the following coronary artery ?
(1) LAD (2) LCX
(3) RCA (4) Posterior decending artery

39. The mean pulmonary capillary wedge pressure in normal individuals is :
(1) 2-5 mm hg. (2) 4-12 mm hg.
(3) 3-10 cm hg. (4) 15-25 mm hg.

40. The normal systemic vascular resistance is :
(1) 200-300 dyne - sec/cm^5 (2) 2000-3000 dyne-sec/cm^5
(3) 700-1600 dyne-sec/cm^5 (4) 100-200 dyne-sec/cm^5

41. Following regarding 99 m Tc sestamibi are true except :
(1) Primary route of excretion is hepatobiliary.
(2) Uptake of sestamibi in myocardium is proportional to blood flow.
(3) Lipophilic anion.
(4) Excretion fraction is 65%.

42. A 30 yr old gentleman presented with history of chest pain and syncope since 2 yrs. Echo showed bicuspid aortic valve and a peak systolic pressure gradient of 76 mm hg. What is the ideal treatment modality ?
(1) AV repair (2) AVR
(3) Medical management (4) Balloon aortic valvuloplasty

43. The mean SaO_2 of blood samples obtained at various levels during catheterization study are as follows :
SVC-68%, IVC-70%, RA-79%, RV-80%, LA-97%, LV-99%, AORTA -99%.
The above values suggest a diagnosis of :
(1) VSD (2) PDA (3) AP WINDOW (4) ASD

44. The mean Sao2 of blood samples obtained at various levels during catheterization study are as follows :
SVC-66%, IVC-71%, RA-72%, RV-84%, LA-97%, LV-98%, AORTA -99%
The above values suggest a diagnosis of :
(1) PDA (2) VSD
(3) Rupture of sinus of valsalva (4) PAPVC

45. Which of the following stress agents used for radionuclide myocardial perfusion imaging increases the myocardial oxygen demand ?
(1) Adenosine (2) Arbutamine
(3) Dipyridamole (4) All of the above

46. Left ventriculogram is used for the assessment of the following except :
(1) Regional Wall Motion Analysis (2) Regurgitation severity
(3) Stenosis severity (4) Location of VSD

47. All the following investigations can be alternative to ventriculography except :
(1) Nuclear scan (2) X - ray (3) MRI (4) Echo

48. Which is not true about low osmolar contrast agents ?
(1) Has less osmotic load (2) Less local pain
(3) Less renal failure (4) More allergic reactions

49. All are contraindications for pulmonary angiography except :
(1) Pulmonary HTN (2) RBBB
(3) Patients on amiodarone (4) LBBB

50. In the RA pressure tracing which is true :
(1) a wave - ventricular systole (2) *x* descent - atrial relaxation
(3) v wave - atrial systole (4) *y* descent - opening of semilunar valves

51. A 58 yr old male with anterior wall myocardial infarction underwent coronary angio and cath following oximetry results showed :
SVC-48%, RA-53%, RV-88%, LV-96%.
Pressures - RA-12/8(10).,RV-120/18,LV-120/16,PA-110/46
Which of the following is the likely diagnosis from the cath data ?
(1) ASD (2) VSD (3) PDA (4) COARCTATION

52. In which of the following shunts, surgery is clearly indicated ?
(1) QP/QS > 2 (2) QP/QS 1.5 : 2 (3) QP/QS 1 : 1.5 (4) QP/QS < 1

53. Which is considerd to be hemodynamically significant lesion of a coronary artery in coronary angiogram ?
(1) A lumen diameter reduction by 25%
(2) A lumen diameter reduction by 30%
(3) A lumen diameter reduction by 50%
(4) None of these

54. Which of the following is not a criterion for assessing the severity of a coronary artery lesion ?
(1) Ulceration (2) Eccentricity (3) Calcification (4) density

55. Gorlin formula for calculation of aortic valve area involves all of the following parameters except :
(1) SEP (2) DFP (3) HR (4) CO

56. Wilkins formula for assessing the suitability of mitral valve for valvotomy includes the following points except :
(1) Mobility (2) Thickening
(3) Subvalvar apparatus (4) Thrombus

57. For balloon pulmonary valvotomy what should be the balloon to annulus ratio ?
(1) 1 to 1.5 (2) 2.0 to 2.5 (3) 2.5 to 3 (4) None of the above

58. Following agents are used for pharmacological stress test except :
(1) Dopamine (2) Dobutamine (3) Adenosine (4) Arbutamine

59. In ERNA which is the agent used for LV function assessment ?
(1) Tetrofosmin (2) Sestamibi
(3) Tc labelled erythrocytes (4) radio labelled albumin

60. Following statements are true about echo transducers except :
(1) for visualisation of the heart and great vessels the frequency required is more than 10 MHz.
(2) Pediatric probes should be of higher frequency due to decreased distance from transducer to chest wall.
(3) As the frequency of the probe increases the resolution decreases.
(4) The Piezo-electric crystal in the transducer emits ultrasonic waves.

61. The following features of m mode echo are true except :
(1) High temporal resolution (2) High sampling rate
(3) High lateral resolution (4) Accurate delineation of wall thickness

62. Which of the following cannot be diagnosed by M mode echo ?
(1) Pericardial effusion (2) Valve morphology
(3) Prosthetic valve function (4) Valvar stenosis

63. Which statement is not true about Doppler ?
(1) It relies on frequency shift of ultrasound beam between moving targets.
(2) Pulse wave Doppler gives the velocity of flow at the sample volume.
(3) A proper alignment of the beam is mandatory to minimise Doppler shift.
(4) Pulse wave helps to identify the high velocity targets.

64. Which of the following statements regarding Doppler echo is true ?
(1) The frequency of sound increases as the source moves away.
(2) Doppler shift is the maximum frequency shift between the two waves.
(3) In Pulse wave Doppler the Doppler pulse is sent continuously.
(4) NYQUIST limit is twice the pulse repetition frequency.

65. Which of the following is true about Doppler echocardiography ?
(1) The peak flow velocity is directly proportional to the transmitted frequency.
(2) Doppler shift is obtained by subtracting the reflected frequency from the transmitted frequency.
(3) The more intense the Doppler signal, the lesser the number of RBC moving at that velocity.
(4) In Pulsed Doppler the measured velocity depends on Pulse repetition frequency and transducer frequency.

66. All are true about continuous and pulse wave Doppler except :
(1) Pulse wave measures velocities < 2 m/sec without aliasing.
(2) Continuous wave measures blood flow velocities along the axis of the entire ultrasound beam.
(3) Pulse wave is best suited for measuring high pressure gradients.
(4) Continuous wave Doppler is done by Duplex and non imaging transducers.

67. Which is true regarding Bernoulli equation ?
(1) Bernoull's principle states that as the speed of the fluid increases, the pressure it exerts increases.
(2) If the velocity proximal to the obstruction is low, it can be neglected in Bernoulli's equation.
(3) Doppler measures peak to peak gradient across an obstruction.
(4) The Doppler derived pressure gradients are often lower compared to cath derived data.

68. During sub-xiphoid imaging of inferior vena cava diameter, which of the following is true ?
(1) If the IVC diameter is > 2 cms with < 50% collapse, the mean Right Atrial Pressure (RAP) is 5-10 mmhg
(2) If the IVC is dilated and non collapsing it indicates a mean RAP of < 5 mmhg
(3) Systolic flow reversal in hepaic veins indicate significant tricuspid regurgitation
(4) IVC diameter correspond to the mean arterial pressures.

69. For assessment of LV diastolic function, all the following criteria are useful except :
(1) Pulmonary vein atrial systolic flow reversal by Doppler
(2) Tissue Doppler at the mitral annulus
(3) Isovolumetric relaxation time
(4) Aortic valve gradients

70. Pulmonary venous Doppler is best obtained from :
(1) RUPV (2) RLPV (3) LUPV (4) LLPV

71. Grade 3 diastolic dysfunction indicates :
(1) Impaired relaxation (2) Pseudonormal pattern
(3) Reversible restrictive pattern (4) Irreversible restrictive pattern

72. Which of the following is not true in grade 4 LV Restrictive filling pattern :
(1) Deceleration time < 160 msec (2) IVRT < 70 msec
(3) PVs2 >> PVd (4) Decreased E/A ratio with Valsalva manevoure

73. All the statements about LV regional wall movements are true except :
(1) When LV wall segment shows systolic inward motion but the amplitude of movement is less it is called hypokinesia.
(2) Dyskinesia indicates outward movement LV wall segment during systole.
(3) There is systolic thickening in a dyskinetic segment.
(4) In akinesia the wall thickening is absent.

74. Which statement regarding Wall Motion Score Index (WMSI) is not correct :
(1) It is obtained by adding the sum of wall motion score and the total number of segments.
(2) It is lower with larger infarcts.
(3) WMSI more than 1.7 indicates a smaller perfusion defect.
(4) It helps in semiquantitativly assessing the wall motion.

75. For global LV function assessment which statement is not true ?
(1) Fractional shortening is used in M-mode echo.
(2) Modified Simpsons method is a highly subjective method.
(3) Eye balling estimates the global LV function to a nearest 10% range.
(4) Averaging data from more than 3 cardiac cycles improves accuracy.

76. Which of the following is not true in echocardiographic study of ischemic heart disease ?
(1) Increase in the number of segments showing wall motion abnormality indicates infarct expansion.
(2) LV aneurysm is the deformation in LV contour during diastole which gets worsened during systole.
(3) Pseudoaneurysm is the breach in the continuity of the myocardium lined by all the layers of the heart.
(4) MR is due to systolic non-compaction.

77. When you are confronted with a patient with acute myocardial infarction and severe cardiac failure which statement is not true regarding acute ischemic MR ?
(1) LA size is enlarged.
(2) MR shows early systolic deceleration in Doppler tracing.
(3) Systolic and diastolic non-coaptation of mitral leaflets.
(4) There is presystolic closure of Mitral valve.

78. Which statement is true about pericardial effusion ?
(1) Effusion which is > 15 mm is called moderate effusion.
(2) Pericardial effusion usually overlaps the LA.
(3) Pericardial effusion can often be between the RV and the diaphragm.
(4) Pericardial effusion ends posterior to the descending aorta.

79. Which is the most specific sign of Cardiac tamponade ?
(1) Late sytolic collapse of RA
(2) Septal dyssynchrony
(3) Dilated IVC
(4) Early diastolic RV collapse

80. In Pericardial effusion which is not true about the Doppler findings in cardiac tamponade ?
(1) More than 40% variation in Tricuspid and > 25% variation in Mitral inflow velocity indicates tamponade.
(2) Pulmonary venous flow velocity decrease during inspiration and increase during expiration is suggestive of tamponade.
(3) Decrease in hepatic forward flow and reversal during expiration is suggestive of tamponade.
(4) Intrapericardial pressures do not play significant role in producing signs of pericardial tamponade.

81. In a patient with rheumatic mitral stenosis which parameter is not important for selection of patients for BMV ?
(1) Mitral leaflet mobility
(2) Clot in the Left Atrium
(3) Mitral valve calcification
(4) Epicardial fat

82. Which is not true regarding Mitral Valve Prolapse (MVP) ?
(1) Late systolic bowing of leaflets > 2 mm is suggestive of MVP.
(2) MR jet is always central.
(3) When the tip of the leaflets prolapse into the LA cavity, it is termed as flail mitral leaflet.
(4) MVP is usually associated with myxomatous MV disease.

83. In a patient referred for mitral valve replacement which of the following indicate severe Mitral Regurgitation ?
(1) Regurgitant area < 8 cm^2
(2) Systolic flow reversal in pulmonary veins
(3) Venacontracta > 3 mm
(4) Regurgitant volume 30 ml/mm^3

84. Which is not true about Aortic valve disease ?
(1) LVH indicates higher degree of stenosis
(2) Mean systolic gdt > 50 mm Hg. indicates severe AVS
(3) Pulmonary Hypertension is associated with Mild AVS
(4) In AVS with LV dysfunction, valve areas can be falsely low

85. The following M mode features of severe AR are true except :
(1) Premature closure of MV
(2) Diastolic opening of Aortic valve
(3) Diastolic AML fluttering
(4) Systolic doming of the aortic valve

86. Tricuspid Stenosis (TS) can be diagnosed by the following features except :
(1) Tricuspid mean diastolic pressure gradient > 2-5 mm Hg in the absence of TR suggests TS.
(2) In severe TR, mean diastolic pressure gradient up to 5 mm Hg, suggests TS.
(3) Tricuspid valve pressure half time > 100 ms indicates severe TS.
(4) RHD is the most common cause of TS.

87. Morphologically RV and LV can be distinguished by the following echocardiographic signs except :
(1) Tricuspid - semilunar valve discontinuity is a feature of RV.
(2) Coarse septal surface is suggestive of LV.
(3) AV valve is more apically placed in the RV.
(4) Moderator band is noted in the RV.

88. Apical view helps in recognising all of the following except :
(1) Muscular VSD
(2) Perimembranous VSD
(3) ASD
(4) Bicuspid aortic valve

89. The most common associated structure to be looked for in imaging the Interatrial Septum in suspected sinus venosus ASD is :
(1) Aorta
(2) Pulmonary venous drainage
(3) Pulmonary arteries
(4) Coronary anatomy

90. The most common complication of supracristal/subpulmonic VSD is :
(1) Pulmonary hypertension
(2) RVOT obstruction
(3) Aortic leaflet prolapse through the defect
(4) Pulmonary venous obstruction