Part 17: CARDIAC RADIOPHARMACEUTICALS

1. Non-radioactive Tl chloride is known to be a very cardiotoxic substance. Why are we not concerned about the chemical safety of Tl when injecting this drug directly into the veins of people with severe heart disease?

a. Radiation dose is very low
b. The injection is performed slowly
c. Tl toxicity is controlled by administration of adenosine
d. The mass of Tl-201 is only a few nanograms and therefore is too low a dose to cause a problem

2. Which of the following is/are properties of the ideal myocardial perfusion agent?

a. A high heart:background ratio is required
b. Lipid solubility is not important
c. Rapid blood clearance is desirable
d. Myocardial uptake is independent of cardiac blood flow
e. All of the above
f. a and c only

3. Which of the following is an example of a myocardial viability agent?

a. Rb-82 chloride
b. I-123 low density lipoprotein
c. F-18 FDG
d. Tc-99m RBCs

4. Which of the following are potassium analogs?

a. Tl-201 chloride
b. Rb-82 chloride
c. F-18 FDG
d. Tc-99m sestamibi
e. all of the above
f. a and b only

5. Cardiac uptake of Rb-82 ion by active transport takes place because...

a. Rb-82 is lipophilic and can cross cell membranes
b. The size, shape, and charge of Rb-82 ion are essentially the same as that of potassium ion, the true physiologic tracer
c. Rb-82 ion is precipitated and immobilized in the ventricles
d. It is enhanced by the infusion of a pharmacologic stress agent like adenosine

6. Consider the radioisotopes Tc-99m, Tl-201, Rb-82, N-13, and F-18, all of which may be used in Nuclear Cardiology studies. Which ONE of the following statements is true?

a. The half life of Tc-99m is shorter than the half-life of F-18
b. The half- life of N-13 is shorter than the half-life of Rb-82
c. The half-life of F-18 is longer than the half-life of Tl-201
d. The half-life of Rb-82 is shorter than the half-life of N-13

7. A stress/rest study can be completed in less than 45 minutes with...

a. Rb-82 chloride
b. F-18 FDG
c. Tc-99m Myoview
d. Tl-201 chloride

8. Which of the following cardiac radiopharmaceuticals is associated with a markedly increased lung uptake in all smokers?

a. Rb-82 chloride
b. F-18 FDG
c. Tc-99m Myoview
d. Tl-201 chloride
e. N-13 ammonia

9. Which of the following cardiac radiopharmaceuticals is considered a myocardial metabolism agent?

a. Rb-82 chloride
b. I-123 fatty acid
c. Tc-99m Myoview
d. Tl-201 chloride

10. For which one of the following radioisotopes does one form an image using primarily X-rays rather than gamma rays?

a. Rb-82
b. Tc-99m
c. Tl-201
d. Xe-133

11. Which of the following radioisotopes used for cardiac imaging is limited to a total activity for a stress/rest study of 5 mCi because of radiation dosimetry considerations?

a. Rb-82 chloride
b. F-18 FDG
c. Tc-99m Myoview
d. Tl-201 chloride
e. N-13 ammonia

12. Which of the following Tc-99m myocardial perfusion agents is a potassium analog?

a. Tc-99m Myoview (tetrofosmin)
b. Tc-99m Cardiolite (sestamibi)
c. Tc-99m teboroxime
d. All of the Above
e. None of the Above

13. Which of the following are appropriate indications for using a Tc-99m myocardial perfusion agent?

a. First Pass Ventriculography
b. Ejection fraction
c. Regional wall motion
d. Gated Equilibrium Imaging
e. b, c, and d only
f. All of the Above

14. Which of the following is/are advantages of using a Tc-99m myocardial perfusion agent?

a. Ideal for SPECT imaging
b. Provides flexible scheduling
c. Can measure perfusion and evaluate wall motion in one study
d. All of the Above
e. a and b only

15. Which of the following was never used to image an acute myocardial infarction?

a. Tc-99m tetracycline
b. Tc-99m glucoheptonate
c. Tc-99m pyrophosphate
d. Tc-99m MAG3
e. In-111 antimyosin antibody

16. Which of the following statements regarding infarct detection with Tc-99m PYP is/are FALSE?

a. The ideal time to image is 12-24 hr post infarction
b. The ideal time to image is 6 days post infarction
c. Tc-99m pyrophosphate binds to hydroxyapatite crystals formed in the acute MI
d. All of the Above
e. a and b only

17. T or F- breast tumor imaging with Tc-99m sestamibi may localize lesions that are missed on mammograms.

18. T or F-- The procedure of breast imaging with Tc-99m sestamibi is highly recommended for annual screening of female patients

19. T or F-- Early images in parathyroid adenoma imaging with Tc-99m sestamibi show the thyroid and parathyroid glands, and adenomas.

20. T or F-- Lesions are most easily visualized on the delayed view in parathyroid adenoma imaging with Tc-99m sestamibi