Self-Assessment Quiz

Gallium Imaging

The Continuing Education Committee presents this self-evaluation quiz on gallium-67 imaging. Answers can be found on page 173. References are listed at the end of the quiz to assist you in your review of this topic. Please select the BEST answer for each of the questions listed below.

1. *Gallium-67 has physical characteristics of:*
   a. 4-day half-life.
   b. decay by photoelectric effect.
   c. 78-hr half-life.
   d. decay by electron capture.
   e. a and b.
   f. c and d. Ref. 1 pp. 421–430

2. *Of the four principal radiations of ^{67}Ga, the greatest abundance arises from the:*
   a. 93 keV.
   b. 184 keV.
   c. 296 keV.
   d. 388 keV. Ref. 1 pp. 421–430

3. *The use of a medium energy collimator and multiple window pulse-height analyzer is necessary for gallium imaging in order to:*
   a. reduce septal penetration of the high peaks.
   b. reduce scatter.
   c. improve sensitivity.
   d. All of the above. Ref. 1 pp. 421–430

4. *Initial blood clearance of carrier-free gallium citrate is fairly rapid, on the order of _____ remaining in the blood at 3 hr post-injection.*
   a. 10%
   b. 15%
   c. 25%
   d. 50% Ref. 2

5. *The effective half-life of carrier-free ^{67}Ga citrate is approximately:*
   a. 44 hr.
   b. 69 hr.
   c. 72 hr.
   d. 78 hr. Ref. 2

6. *The 9%–15% excretion of ^{67}Ga citrate through the gastrointestinal system may require:*
   a. adequate bowel preparation.
   b. repeated views over successive days.
   c. tomographic imaging of the abdomen.
   d. All of the above. Ref. 1 pp. 421–430

7. *In cases of fever of unknown origion (FUO), gallium scintigraphy is often the screening image of choice.*
   a. True
   b. False Ref. 3 pp. 115–117

8. *In cases of infection, abscesses may be evident in gallium scintigraphy as soon as:*
   a. 1–2 hr.
   b. 4–6 hr.
   c. 24–36 hr.
   d. 48–72 hr. Ref. 4 pp. 81–83

9. *Tumor or metastatic diagnosis with ^{67}Ga scintigrams should take into account:*
   a. the biologic half-life of the agent.
   b. accumulation in recent biopsy or surgical sites.
   c. renal accumulation.
   d. cross scatter in multi-window registration. Ref. 5 pp. 1320–1322

10. *SPECT is more accurate than planar imaging in depicting foci of gallium-avid lymphoma in the chest and abdomen.*
    a. True
    b. False Ref. 6 pp. 111–114

11. *In situations of lymphoma or Hodgkin's disease, gallium imaging is most useful as:*
    a. an initial diagnostic process.
    b. a staging and follow-up of therapy.
    c. an alternative to CT.
    d. the sole diagnostic modality. Ref. 7 pp. 327–331.

12. *A combination of ^{99m}Tc and ^{67}Ga imaging is a more desirable imaging technique than radiographs in cases of osteomyelitis.*
    a. True
    b. False Ref. 8 pp. 123–129

13. *Gallium scanning has found increased routine use in the evaluation of the following pulmonary conditions except:*
    a. sarcoidosis.
    b. interstitial lung disease.
    c. pneumococcal pneumonia.
    d. metastatic breast CA. Ref. 3 pp. 115–117

14. *Planar gallium imaging of the chest suffers from:*
    a. over and underlying activity of sternum and spine.
    b. lack of precise depth determination of active foci.
    c. poor target-to-background ratios.
    d. hilar activity versus mediastinal disease differentiation.
    e. All of the above. Ref. 9 pp. 111–114

15. *The identification of the depth and extent of gallium-avid foci is easily visualized with the use of SPECT.*
    a. True
    b. False Ref. 9 pp. 111–114

References

1. Davis SJ, Preston DF. Inflammatory process and tumor imaging. In: Bernier D, Langan JK, Wells, eds. *Nuclear Medicine Technology and Techniques*. St. Louis: CV Mosby, 1981:421–430.

2. Goswitz FA, Andrews GA, Viamonte M. Clinical uses of radionuclides. AEC Symposium, Series 27, Washington DC, 1972.

3. Alazraki NP, Mishkin FS, eds. *Fundamentals of Nuclear Medicine*. New York: Society of Nuclear Medicine, 1984:115–117.

4. Phan T, Wasnich R. *Practical Nuclear Pharmacy*. Honolulu: Banyan Enterprises Ltd., 1981:81–83.

5. Freeman L, ed. *Freeman and Johnson's Clinical and Radionuclide Imaging*. Orlando, FL: Grune and Stratton, 1984:1320–1322.

6. Tumeh SS, Rosenthal DS, Kaplan WD, et al. Lymphoma: Evaluation of Ga-67 SPECT. *Radiology* 1987;164:111–114.

7. Anderson KC, Schor R, Ashby D. Gallium imaging in lymphoma. *Am J Med* 1983;75:327–331.

8. Lisbona R, Rosenthall L. Observations on the sequential use of ^{99m}Tc phosphate complex and ^{67}Ga imaging in osteomyelitis, cellulitis, and septic arthritis. *Radiology* 1986;123:123–129.

9. English RJ, Brown SE. *Single-Photon Emission Computed Tomography: A Primer*. New York: Society of Nuclear Medicine, 1986:111–114.