

## Nuclear medicine

Note: The examination for those who are recertifying their subspecialty certificate (CAQ) in nuclear medicine or for those who choose 3-4 modules in nuclear medicine will have greater depth and breadth than the examination for those choosing 1-2 modules. These subspecialists should expect more questions on some of the less common procedures such as CNS imaging and cardiac PET as well as a greater number of questions on quality control and the Nuclear Regulatory Commission

### 1 Endocrine

- Benign thyroid disease (including thyroid nodules, thyroiditis, organification defect, sublingual thyroid, hyperthyroidism)
- Thyroid cancer
- Parathyroid disease (including adenoma, hyperplasia, ectopic parathyroid)
- Adrenal and neuroendocrine imaging
- Therapy (including hyperthyroidism and thyroid cancer)

### 2. Gastrointestinal

- Hepatobiliary (including cholecystitis, common bile duct obstruction, biliary leaks, post operative evaluations, use of pharmacological agents)
- GI bleeding (including colon, small bowel, Meckel's diverticulum, retained gastric antrum, varices)
- Liver/spleen (including altered tracer distribution, masses, vascular abnormalities, accessory spleen)
- GI motility (including solid, liquid, mixed, reflux)

### 3. Genitourinary

- Diuretic studies
- Renal artery occlusion and renal vein thrombosis
- Cortical imaging, ectopic and horseshoe kidney
- Acute tubular necrosis (ATN)
- Transplant kidneys and their complications
- Ureteral reflux and cystography
- Testicular imaging

### 4. Cardiac

- SPECT and gated SPECT myocardial perfusion studies (including different radiopharmaceuticals, techniques and protocols, pharmacological stress agents, technical artifacts, infarction, ischemia, stunned and hibernating myocardium, non-coronary disease)
- Wall motion studies using gated blood pool imaging (including coronary artery disease; non-coronary disease; EF, volume, phase and amplitude analysis; artifacts and technical aspects)
- PET cardiac imaging

## 5. Central nervous system

- Brain death
- Dementias (PET and SPECT)
- Seizure work-up (PET and SPECT)
- Cerebrovascular disease
- Tumors (PET and SPECT)
- Infection and inflammation
- CNS stress tests (including Wada test, Diamox, balloon occlusion)
- CSF studies

## 6. Musculoskeletal

- Benign tumors
- Malignant tumors (primary and metastatic including the effect of therapy)
- Metabolic and vascular abnormalities
- Trauma
- Infection and inflammation (including different imaging techniques)
- Soft tissue uptake, including benign, malignant and technical causes)

## 7. Pulmonary

- Thromboembolic disease
- Non-thromboembolic disease
- Airway disease
- Pre-operative work-up and post-therapy changes
- Shunts
- Congenital disease
- Techniques and artifacts

## 8. Tumor imaging

- PET and not-PET techniques (including protocols, patient preparation, quantitation, artifacts)
- Benign and malignant disease
- Pre-operative work-up
- Response to therapy
- Lymphoscintigraphy
- Therapy (including Iodine-131, Strontium-89, Samarium-153)

## 9. Infection and inflammation

- Different techniques and agents
- Altered tracer distribution
- Soft tissue and musculoskeletal infection/inflammation
- Immunocompromised patients
- Post therapy changes

## 10. Quality control/Nuclear Regulatory Commission Issues

- Radiopharmaceuticals (including radiation dose, quality control, spill procedures, safe handling, receipt and storage/disposal)
- Instrumentation (including imaging cameras, dose calibrator, generators)
- Personnel issues (including exposure to radiation workers, pregnant technologists)
- Patient-related issues (including pregnant patients, breast feeding patients, radioactive body fluids, radiation security detectors)
- Radiation safety (including radiation exposure, ALARA, Radiation Safety committee)
- Administration and licensure (including radiation area rules and signage, reporting and record keeping, inspections)
- Adverse events (including radiation emergencies, medical events)

Sample Questions:

The following is an example of a multipart image based question containing a block and a follow-up text-only question:

**QUESTION 1A**



Which of the following is the most likely diagnosis for the finding on the  $^{123}\text{I}$  scan above:

- A. multinodular goiter.
- B. thyroid carcinoma.
- C. thyroiditis
- D. lymphoma
- E. solitary adenoma.

**ANSWER = E**

**AT THIS POINT YOU WILL BE TOLD THAT IF YOU MOVE TO THE NEXT PAGE YOU CANNOT CHANGE YOUR ANSWER TO QUESTION 1A. YOU WILL BE ABLE TO GO BACK TO VIEW THE IMAGES AND QUESTION.**

**QUESTION 1B**

Approximately what percentage of hot nodules on a  $^{123}\text{I}$  scan are malignant?

- A. 0.1-0.9%
- B. 1-5%
- C. 6-10%
- D. 11-20%

ANSWER = B

The following is an example of a non-image based question.

**QUESTION 2**

Which of the following methods should be used in patients with pulmonary hypertension to decrease the risk associated with lung perfusion studies.

- A. Decrease both the number of Tc-99m MAA particles used and the activity administered
- B. Decrease the number of Tc-99m MAA particles used but keep the activity administered unchanged
- C. Inject the Tc-99m MAA slowly over a 5 minute period
- D. Inject the Tc-99m MAA as a rapid bolus over 2 seconds

ANSWER = B