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What is the half-life, preferred collimator and principal energies detected of Gallium67?

First of all, remember that gallium 67 is the general nuclear medicine agent and Gallium 68 is the PET agent. Gallium 67 has a half-life of 78 hours with energies of approximately 100, 200, 300 and 400 keV with the majority in the 100 and 200 keV range so a medium energy collimator is best. Gallium is one of few agents that have lacrimal gland uptake so if you see this think Gallium first. With Gallium: liver uptake > spleen uptake. Key uses: spinal osteomyelitis—better sensitivity than tagged WBC scan—and pulmonary infection such as PCP in HIV (look for diffuse lung uptake). Critical organ: colon

How do you safely receive a shipment of radioactive materials?

1) Wear Gloves and radiation monitoring badge

2) Inspect package for visual signs of damage or leak

a) If package appears damaged notify your radiation safety officer

3) Check for external radiation first at 1 meter (with ion chamber detector) and then at surface

(wipe test)

a) Radiation level at 1 meter must fall below that of the transportation index indicated in

the small rectangular box towards the bottom of the diamond label

i) If radiation level is much different than the transportation index you must notify

your radiation safety officer and await instructions

ii) Ion chamber better than Geiger-Mueller counter as GM counter may over-respond

b) Wipe 300 cm2 of surface of package and assay within a well counter

i) See institutional policies but generally 220 dpm/cm2 is a common limit to stop and

notify your radiation safety officer. If under this amount you may be able to decontaminate and proceed, although still notifying the RSO. If under 22 dpm/cm2 you are good to go without decontamination or notifying RSO.

4) Remove packing slip if above is ok

a) Ensure that the correct material went to the correct recipient

5) Open outer and inner packaging and confirm the contents match that on the packing slip

6) Visually inspect shielded container for damage

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a) If appears damaged wipe the container and assay in well counter

7) If all ok, don't forget to remove the radioactive labels and discard

a) You cannot discard the container with the radioactive label in place

8) Record the receipt of your package

a) Nuclear Regulatory Commission requires records be kept 3 years, agreement states may be 3-5 years

9) Return empty re-usable shipping box(es) to the vendor

a) Ensure no contamination on the package and de-contaminate if necessary. b) Make sure to remove the radiation label

What is Hadju Cheney syndrome?

Hadju Cheney Syndrome is notable for acroosteolysis of the hands and feet. Familial condition, autosomal dominant. Other features include a short stature, craniofacial abnormalities, wormian bones, polycystic kidneys, and neurologic symptoms.

What are common upper lobe-predominant lung diseases?

Upper lobe predominant lung diseases include:

1) Pneumoconioses

    a) Silicosis

    b) Coal Workers Pneumoconiosis

    c) Progressive massive fibrosis

    d) Berryliosis

    e) Inhalation talc pneuomoconiosis

2) Tuberculosis

3) Sarcoidosis

4) Respiratory bronchiolitis-interstitial lung disease (RB-ILD)

5) Caplan syndrome

6) Ankylosing spondylitis

7) Allergic bronchopulmonary aspergillosis (ABPA)

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8) Centrilobular emphysema

9) Cystic fibrosis

10) Langerhans Cell Histiocytosis

For which indications is breast MRI recommended for high-risk screening?

Recommended for women with >20% risk of developing breast cancer. Includes women with high-risk family history and/or known mutations including untested first-degree female relatives with BRCA1/BRCA2, Li-Fraumeni syndrome, Cowden Syndrome, Banayan-Riley-Ruvalcaba syndrome, Chest radiation (often for lymphoma treatment) between ages 10-30, and the ACR recommends breast MRI for women with prior breast cancer who have dense breast tissue or who developed premenopausal cancer

What are common imaging features of papillary carcinoma of the breast?

Papillary Carcinoma: Rare subset of breast cancer typically presenting in a postmenopausal woman. Demonstrates circumscribed margins in many cases. The mass may have associated suspicious calcifications on mammography. On ultrasound, look for a complex cyst with thick septations or classically a cystic mass with a vascular mural nodular component. On MRI expect an enhancing complex cyst with irregular enhancing nodular components. This could also present as a solid mass without cystic components but it is probably less likely to show you this appearance on board exams. I think it is more likely to present the intracystic papillary carcinoma variety on test questions. Differential consideration includes IDC with necrosis.

What are features by which neurofibromatosis type I is diagnosed?

To diagnose NF1, you need 2 or more of the following:
At least two neurofibromas or one plexiform neurofibroma
Optic nerve glioma
>6 café au lait spots in one year
Axillary and inguinal (intertriginous) freckles
Osseous involvement
Sphenoid wing dysplasia
Pseudoarthrosis
2+ iris hamartoma (Lisch nodules)
First degree relative with NF1

What is the difference between a stress fracture and an insufficiency fracture?

Fracture resulting from abnormal stress on normal bone = stress fracture

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Fracture from normal stress on abnormal bone = insufficiency fracture

What is typically performed first for a VQ scan—the ventilation or perfusion scan?

Ventilation is typically performed before perfusion.

What radiotracers are commonly used for the ventilation portion of the VQ scan and what are the energies of these radiotracers?

1. Xenon 133 which emits an energy of 81 keV. Remember that Xe133 is lipophilic and requires a negative pressure room when you use this. 2. TcDTPA or Tc-Technegas (outside of USA) with 140 keV.

What radiotracer is commonly used for the perfusion portion of a VQ scan?

Tc-MAA

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