What You Should Know about Medical Radiation Exposure for Reducing Radiation Exposure: Check Your Knowledge as a Radiation Expert

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Radiograph

1. What is the threshold dose of stochastic effect?

A. 0 (no threshold)
B. 1 mSv
C. 10 mSv
D. 100 mSv
E. 1000 mSv

Radiograph

2. What is the incorrect example of deterministic effect?

A. Lenticular clouding
B. Skin rash, erythema, erosion
C. Decreased cellularity of bone marrow related with anemia
D. Infertility
E. Leukemia

Radiograph

3. What is the incorrect statement for effect of radiation?

A. Higher dose rate, greater effect of radiation
B. More harmful in focal radiation than in whole-body radiation
C. More effective radiation on condition of high temperature
D. More effective radiation on condition of high oxygen saturation

Radiograph

4. Which of the followings is the most susceptible to radiation exposure?

A. Pancreatic cancer
B. Gall bladder cancer
C. Lung cancer
D. Cervical cancer
E. Renal cell carcinoma

Radiograph

5. The following statements show the relative risk of each imaging modality. choose the correct answer.

Modality	Relative risk
A. Chest X-ray	- 1/1000000
B. IVP	- 1/10000
C. Chest CT	- 1/2000
D. Cardiac angiogram	- 1/2000
E. Natural background	- 1/5000

Radiograph

6. Person undergoing exam using an X-ray can be radioactive.

O X

X-ray does not induce radioactivity.

https://rpop.iaea.org/RPOP/RPoP/Content/InformationFor/Patients/patient-information-x-rays/index.htm

CT

1. What is the correct way to reduce radiation dose on coronary CT?

A. High kV
B. Small field of view
C. Wide z-axis coverage
D. Multi-segment reconstruction
E. Prospective ECG-gating scan (Step-and-shoot)

CT

2. What is the effective dose among the following parameters?

Dose length product (DLP) = 500 mGy*cm
Regional specific conversion factor: 0.017 mSv/mGy·cm for chest

A. 5.4 mSv
B. 6.1 mSv
C. 8.5 mSv
D. 13.6 mSv
E. 34.0 mSv

CT

3. Choose the incorrect way for reducing of overranging?

A. Helical scanning may not be necessary.
B. Scan with a large detector collimation: may not be necessary.
C. It may be possible to use a larger pitch.
D. One should attempt to maximize the distance between radiose nsitive organs and the imaged area, keeping in mind that overra nging extends the imaged area by several centimeters.

CT

4. What is correct conversion between CT and chest radiographs of the same effective dose?

CT examination	Chest PA(each 0.02mSv)
A. Head	100
B. Neck	150
C. Spine	150
D. Coronary angiography	435
E. Chest (pul. Embolism)	750

CT

5. What would be your answer for a patient asking about necessity of whole body CT for a screening purpose?

A. Helpful, if he or she can afford it
B. Not necessory before the age of 40
C. Some research proved the usefulness of whole body CT
D. Not necessory as a screening purpose

CT

6. What is the right anwer for patient asking about "How many times can chest CT be done for 1 year?"

A. 1 time is safe
B. Until 3 times
C. Until 5 times
D. No advantage, no exam

Fluoroscopy & Angiography

1. Which of the followings is wrong to reduce radiation dose during fluoroscopy or angiography?

A. Using grid
B. pulsed mode of X-ray
C. High kVp
D. Minimal use of magnification
E. Using Cu filter at the side of collimator

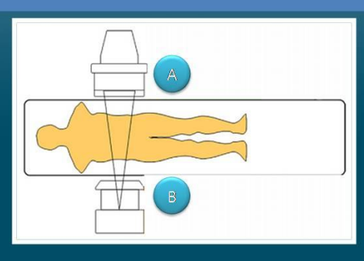
Fluoroscopy & Angiography

2. Which of the followings is correct to reduce radiation dose during angiography?

A. Using magnification
B. High mAs
C. More increase the distance between patient and image intensifier
D. Using spot image more than image capture
E. Reduce the field of view

Fluoroscopy & Angiography

3. Which side has lower radiation exposure?



Mammography

1. Which of the followings is recommended for a patient who is sensitive to compression?

A. Keep going with lower pressure on peddle
B. Persuade patient for endurance of the discomfort
C. Using the cushion between peddle and breast
D. Keep going without compression

Nuclear

2. An isolated restroom is needed for a patient injected with radioactive drugs .

O X

IAEA Training Material on Radiation Protection in Nuclear Medicine

Check your score

Imaging modality

- Radiograph (6)
- CT (6)
- Fluoroscopy,angiography(3)
- Mammography(1)
- Nuclear(2)

Special issues

- Pediatric(4)
- Pregnancy(8)

Reference

- http://www.radiologyinfo.or.kr
- http://www.radiologyinfo.org
- www.imagegently.org
- http://www.isrrt.org/isrrt/Radiation_protection_website_IAEA1.asp?SnID=2
- BEIR VII

Nuclear

1. Which of following steps is more expose the radation for health care professionals using radioactive drugs?

A. Mixing radioisotope (Ex: 99mTc) and Ligand(Ex:MDP)
B. Interpretation of the exam result
C. Injection of radioisotope drug (Ex: 99mTC-MDP)
D. Transfortation of ligand

Answer: A, C

Pediatric

1. Which of the followings is wrong to reduce radiation exposure in CT for pediatric patients?

A. Using filtration
B. Proper collimation
C. Using shied for the radiosensitive secific organs
D. Longer exposure time

Answer: D

Pediatric

2. Which of the folloings is incorrect to reduce radiation dose in CT for pediatric patient?

A. Lower kVp
B. Tube current modulation → Scout imaging with shied
C. lowering mAs correlting length of patients
D. Not routine use preenhanced CT scan during enhanced CT protocol
E. Using adaptive collimator for reducing extradose by overranging

Pediatric

3. Which of the followings is incorrect about radiation safety for pediatric patients?

A. Longer life expectancy
B. Increased radiosensitivity
C. Cumulative dose over a life time
D. Size based adjustments in technique
E. Degraded images by overexposure

Pediatric

4. Which of the followings is not the indication of the routine exam?

A. Skull radiograph for patients with epilepsy
B. Skull radiograph for patients with headache
C. Sinus radiograph for less than 5-year-old patients with suspicious sinusitis
D. Cervical spine radiograph for patients with torticolis without history of trauma
E. Contralateral radiographs for patients with injury of the extremities

Answer : all

Pregnancy

1. Which of the followings is correct in exams using radiation during pregnancy?

A. X-ray procedures should be prohibited
B. Only possible for diagnostric purpose
C. According to patient's request
D. X-ray procedures do not affect pregnancy

Answer : B

Pregnancy

2. Which period is most susceptible to radiation exposure?

A. 1st trimester
B. 2nd trimester
C. 3rd trimester

Answer : A

Pregnancy

3. High radiation exposure in the preimplant(~10 days) preiod increases the risk of congenital malformation.

O X

Normal fetus or stillbirth

http://www-pub.iaea.org/MTCD/publications/PDF/Pub1198_web.pdf

Pregnancy

4. What is the ten-day rule ?

"Whenever possible, one should confine the radiological examination of the lower abdomen and pelvis to the 10-day interval following the onset of menstruation."

https://rpop.iaea.org/RPOP/RPoP/Content/SpecialGroups/1_PregnantWomen/PregnancyAndRadiology.htm

Pregnancy

5. Nuclear exams are contraindicated during pregnancy.

O X

For example, ventilation scan can be done for diagnosis of pulmonary embolism.

http://www-pub.iaea.org/MTCD/publications/PDF/Pub1198_web.pdf

Pregnancy

6. The radioactive drug injected to a pregnant patient can be transmitted to a fetus.

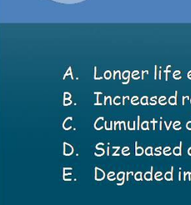
O X

1. Through the placenta
2. Exposure from remained radioisotope within the urinary bladder

http://www-pub.iaea.org/MTCD/publications/PDF/Pub1198_web.pdf

Pregnancy

7. Breast feeding can be resumed one week after nuclear exams.



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- Breast feeding should be paused until elimination of radioisotope in the mother's body (ICRP 84)

IAEA Training Material on Radiation Protection in Nuclear Medicine Part 11.

Pregnancy

8. What is the recommended pregnancy avoidance period after irradiation therapy? (In accordance with ICRP guideline)

A. I-131 iodide (thyroid ca) --------- 4 months
B. I-131 iodide (thyrotoxicosis) ------ 4 months
C. I-131 MIBG ---------- 4 months
D. Sr-89 chloride ---------- 24 months
E. Au-198 colloid ---------- 2 months