



Islamic University / Najaf
College of Medical Technology
Department of Radiology Techniques



Radiation Protection 1

Stage 2

Lecture 6

Medical Sources

By

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Factors Affecting Patient Dose

Insufficient radiation dose result in increased noise and degradation of image quality. An increase in radiation dose above a certain level dose not further improve image quality, it merely deposits more radiation in the patient's body. Radiation dose can be modified by adjusting the tube voltage, tube current, time, scan coverage, collimation or detector configuration, pitch, and table movement.

Dose Affecting Factors in Radiography

- 1-** X-Ray beam energy (kVp): The amount of tube voltage (kVp) affects radiation dose. Reduction of the tube voltage will decrease the output of the x-ray tube and reduce the radiation dose to the patient.
- 2-** Tube Current and Exposure Time (mAs): The patient dose is proportional to mAs.
- 3-** Added Filtration: Higher added filtration results in lower dose.
- 4-** Collimation: Aggressive collimation reduces the irradiated area as well as scatter radiation.
- 5-** Grids: grids reduce scatter radiation but increase patient dose.
- 6-** Image receptor: Faster speed image receptor reduces patient dose.

Dose Affecting Factors in Mammography

1- Filter materials

2- Grids

3- Compression

4- Breast size and tissue composition

Dose Affecting Factors in Nuclear Medicine

1- Biology

- Uptake and clearance rates of activity in various source organs.

2- Physics

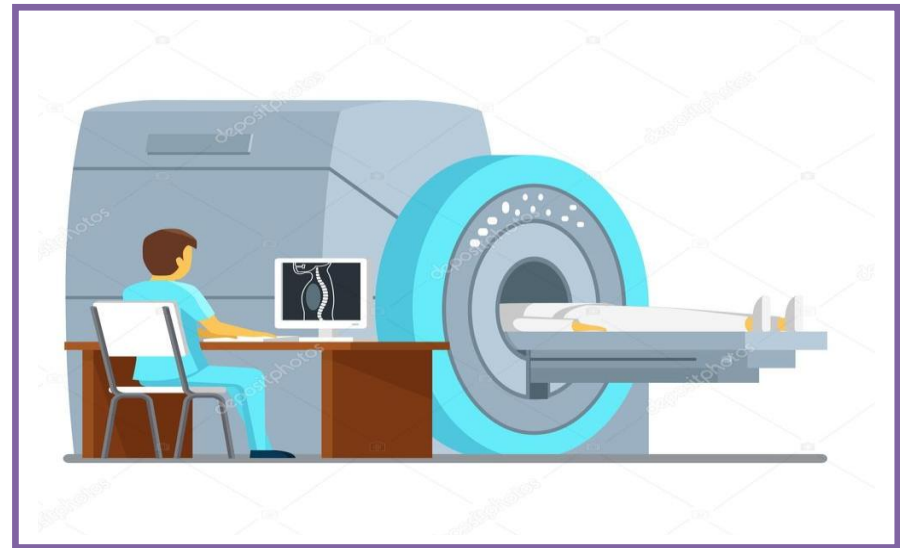
- Patient geometry

- Radioactive decay characteristics (number, type and energy of emissions)

Computed Tomography (CT)

Refers to a x-ray imaging procedure in which of x-rays is aimed at a patient and quickly rotated around the body. producing signals that are processed by the machines computer to generate cross-sectional images, or

“slices” .These slices are called tomographic images and can give a clinician more detailed information than conventional x-rays. Once a number of successive slices are collected by the machines computer, they can be digitally “stacked” together to form a three-dimensional (3D) image. Allows for easier identification of as well as possible tumors or abnormalities.



Dose Affecting Factors in Computed Tomography (CT)

- 1-** kVp tube
- 2-** Tube current and time (mAs)
- 3-** Patient size

Interventional Radiology and Diagnostic Angiography

Diagnostic angiography is the study of the blood vessels, and the imaging procedure most commonly used to do this is called an angiogram. An angiogram is a type of interventional radiology procedure that uses x-ray technology to guide a small tube called a catheter through the patient's major arteries. The procedure can be used for diagnostic and therapeutic reasons, but as a diagnostic procedure an angiogram can be particularly helpful in detecting blood vessel disorders such as aneurysms and malformations.

