



## **Fifth Lecture 22/10/2023**

### **Radiation Protection Course**

#### **Lecturer**

**Prof. Dr. Amer A. AlQara'wi**

## **Chapter Six**

### **Dose and management principles in Special cases**

X-ray and pregnancy are topics that require careful consideration and management, as exposure to ionizing radiation can potentially harm the developing fetus. However, there are situations in which X-rays may be necessary for diagnosing or treating medical conditions in pregnant individuals. Here are some key principles and considerations for the use of X-rays during pregnancy:

### **X-rays and pregnant patient**

#### **Pregnancy Status Assessment:**

In most cases, healthcare providers may not be aware of a pregnancy when an X-ray is ordered. Thus, it's important for patients to inform their healthcare providers if they are pregnant or suspect they may be. In situations where a pregnant patient requires an X-ray, steps should be taken to estimate the gestational age of the fetus to determine the potential risk level.

**Radiation Exposure Levels:** The risk associated with X-rays during pregnancy depends on the dose of radiation and the stage of pregnancy. High doses of radiation can be harmful to the developing fetus, especially during the first trimester when organs and tissues are forming. However, the risk decreases as the pregnancy progresses.

**Lead Shielding:** When an X-ray is considered necessary during pregnancy, medical professionals take steps to minimize the radiation exposure to the fetus. This often includes the use of lead shielding, such as lead aprons and thyroid collars, to cover and protect the abdominal and pelvic areas.

**Collimation:** X-ray beams should be carefully collimated to target the specific area of interest and minimize exposure to surrounding tissues.

**Types of X-rays:** Some X-ray procedures, like dental X-rays, chest X-rays, and extremity X-rays, expose the fetus to lower levels of radiation because the primary X-ray beam is not directed at the abdomen or pelvis. However, abdominal or pelvic X-rays may expose the fetus to more radiation.

**Alternative Imaging Techniques:** In many cases, non-ionizing imaging techniques like ultrasound and magnetic resonance imaging (MRI) can be used as safe alternatives for pregnant women and do not expose the fetus, as they do not involve ionizing radiation.

**Timing of X-Rays:** X-rays should ideally be scheduled during the second trimester (weeks 14-27) if possible, as this is the period of lower fetal sensitivity to radiation. In situations where immediate diagnostic information is required, an X-ray during any trimester may be unavoidable. The decision should be made based on the medical necessity and potential risks.

**Lowest Effective Dose:** Radiologic procedures should be adjusted to deliver the lowest effective dose of radiation necessary to obtain diagnostic images. Modern X-ray equipment is designed to limit radiation exposure as much as possible.



## **X-rays and pregnant technologist**

X-ray technologists, also known as radiologic technologists or radiographers, are healthcare professionals responsible for operating X-ray machines and other imaging equipment to create diagnostic images of the inside of the body. However, when it comes to pregnant women, special precautions and considerations are necessary to ensure the safety of both the mother and the unborn child.

Here are some key points to consider regarding X-ray technologists and pregnant patients:

**Radiation Safety:** Pregnant X-ray technologists must be especially cautious about radiation exposure. Prenatal exposure to ionizing radiation can potentially harm the developing fetus. As such, these technologists need to adhere to strict radiation safety protocols and minimize their radiation exposure as much as possible.

**Dose Monitoring:** Monitoring radiation dose is crucial. X-ray machines should be equipped with dose monitoring systems that track and record the amount of radiation exposure. Pregnant technologists should regularly review their dose records to ensure they remain within safe limits.

**Regular Health Checkups:** Pregnant X-ray technologists should undergo regular health checkups and consult with their healthcare provider to assess the well-being of both themselves and their developing fetus. Any concerns or symptoms related to radiation exposure should be promptly reported and addressed.

## **X-ray and obesity**

Obesity can have implications for X-ray procedures, as it may affect the quality of the images and the interpretation of the results. Here are some key considerations when performing X-rays on obese patients:

**Increased Radiation Exposure:** Obese individuals typically have more body fat, which can attenuate X-rays to a greater degree than leaner individuals. As a result, it may be necessary to increase the radiation dose to obtain clear images, which can pose a higher risk of radiation exposure to the patient. However, it's essential to balance the need for image quality with minimizing radiation exposure.

**Positioning and Support:** Proper positioning of the patient can be more challenging with obese individuals due to limited mobility or discomfort. Radiologic

technologists may need to use positioning aids or adapt their techniques to ensure the patient is correctly positioned for the X-ray.

**Increased Time and Effort:** X-ray procedures on obese patients may take longer and require more effort, both in positioning the patient and acquiring the images. This can affect the overall workflow of the radiology department.

**Interpretation:** Radiologists may encounter challenges in interpreting X-rays of obese patients due to the obscured view of certain anatomical structures. Radiologists may need to rely on clinical history and other imaging modalities like CT scans or MRI to supplement their findings.

## **X-ray and Obese technologist**

When it comes to radiologic technologists who are obese, there are specific considerations to ensure their well-being and effectiveness in their role, as well as to maintain patient comfort and safety. Here are some important points to consider:

**Equipment and Uniforms:** Radiologic technologists may require larger-sized lead aprons and uniforms to ensure they are adequately protected from radiation exposure. It's essential to provide proper-fitting protective gear to ensure their safety during X-ray procedures.

**Physical Demands:** Radiologic technologists need to be able to move and position patients, which can be physically demanding. Obese technologists may face additional challenges due to their weight. Facilities should consider implementing assistive devices or additional personnel to help with patient positioning and transfers.