

Review Article

Challenges were faced during radiography of pregnant women

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ABSTRACT

Radiography of pregnant patients poses significant challenges to radiographers due to the need to balance diagnostic requirements with the safety of the developing foetus. This article explores the challenges faced by radiographers when conducting radiographic procedures on pregnant women and their foetus and discusses strategies employed to minimize radiation exposure. Key challenges include the risk of foetal radiation exposure, timing of examination, proper positioning of the patient and patient anxiety. Strategies such as radiation shielding, collimation, low-dose techniques and alternative imaging modalities are crucial for minimizing radiation exposure while obtaining diagnostic information. Clear communication between radiographers and patient is essential to ensure the safety and well-being of both the mother and the foetus during radiographic procedure. Radiographers knows the dangers of radiation exposure to fetal health. Now days, diagnostic imaging of pregnant women is increasing. X-ray risks depending on the gestational age of the pregnancy, and other potential health effects. In addition, ethical issues have been considered by improving overall communication to minimize unnecessary radiation exposure to pregnant women and fetuses.

Keywords: X-rays, Ionizing radiation, Pregnant women, Exposure, Imaging

INTRODUCTION

Radiography involves using x-rays to create images of the inside of the body, which provides information about diseases. During pregnancy, women's body frequently changes and can face various diseases which can be diagnosed with radiography. during radiography people may be exposed to large amount of "high potential energy" radiation much more than we get from everyday exposure like X-rays. Exposure to large amount of high energy radiation or ionizing radiation can cause harmful effects on people. However, when it comes to pregnant women, there is concern about the potential risk associated with exposing the foetus to radiation. during pregnancy the developing foetus is more sensitive to radiation exposure This is because the foetal cells are

dividing and growing quickly, when the organs are forming. high doses of radiation can increase the risk of birth defects like- stunted growth, deformities, abnormal brain function, cancer may develop sometimes later in life.¹

The possibility of severe health effects depends on the gestational age of the foetus at the time of radiation exposure and the amount of radiation it is exposed to Foetus is highly sensitive to radiation during their early development between 2nd and 18th week of pregnancy. Women have an increased risk of foetal miscarriage.² The health effects to the foetus can be severe even the radiation exposure doses is too low to make the mother sick. Fetus is less sensitive to radiation exposure during later stages of pregnancy (after 18 weeks).³

REVIEW

The general principle for imaging during pregnancy is similar to imaging for the general public, with the goal of radiation exposure being as low as reasonably achievable (ALARA).

Table 1: Risks related to radiation dose.

Fetal dose less than 10 mGy	There is no evidence of any deleterious developmental effects on the fetus at diagnostic doses within this range
Fetal dose between 10 mGy and 100 mGy	The additional risk of gross congenital malformations mental retardation, intrauterine growth retardation and childhood cancer is believed to be low compared to the baseline risk
Fetal dose exceeding more than 100 mGy	The developing fetus is most vulnerable to radiation doses more than 100 Mgy between 8 weeks and 15 weeks of gestational age. Overall, exposure at levels exceeding 100 mGy/10 rem could result in a dose-related increased risk of spontaneous abortion in early gestation period, intrauterine growth retardation and central nervous system defects, such as microcephaly and mental retardation in second or early third trimester. Intelligence quotient deficit are sometimes detectable at doses more than mGy.

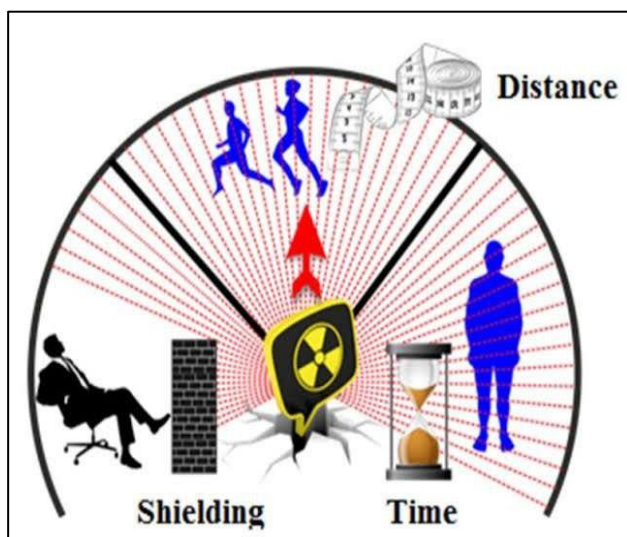


Figure 2: Three basic considerations for protecting yourself from radiation according to ALARA.

Generally, ALARA principle includes the time of exposure, position of the patient as much as possible

away from the X-Ray source, using the correct shielding equipment.

Table 2: Foetal doses from different methods of radiography.⁵

Method	Protocol	Max	Mean
Xray	Skull or thoracic spine	<0.01	<0.01
	Chest	<0.01	<0.01
	Lumbar spine/intravenous urogram	1.7	10
	Abdomen	1.4	4.2
	Pelvis	1.1	4
Fluroscopy	Barium meal	1.1	5.8
	Barium enema	6.8	24
CT	Head CT	<0.005	<0.005
	Chest CT	0.06	1.0
	Lumbar spine	2.4	8.6
	Abdomen CT	8.0	49
	Pelvis CT	25	80
Nuclear medicine	Tc-bone	3.3	-
	Tc-brain	4.3	-

Risk vs benefit assessment

Radiography of pregnant patients is typically deferred. Until after the 1st trimester as this is when the foetus is most vulnerable to radiation induced harm. However urgent diagnostic needs may necessitate imaging during any stage of pregnancy.

In such cases the benefits of the procedure must outweigh the risks and the lowest possible radiation dose should be used.⁶

This article explores the several challenges that healthcare professionals need to consider to ensure the safety of both the mother and the developing fetus. During radiography of pregnant women.

Minimizing radiation exposure

The primary concern is to minimize radiation exposure to the foetus. Radiography involves the use of ionizing radiation, which can be harmful to the developing baby, especially during the first trimester when organs are forming. Techniques such as shielding the abdomen with lead aprons and using the lowest possible radiation dose are essential while obtaining diagnostic images. using collimation to focus the X-ray beam solely on the area of interest help to reduce unnecessary exposure.

Diagnostic dilemma

Balancing the need for diagnostic information with the safety of the mother and developing foetus can be challenging. Healthcare providers must determine the

most appropriate imaging modality that can provide the required diagnostic information which causes the least risk to the foetus.

In some cases, alternative imaging techniques that do not use ionizing radiation, such as ultrasound or magnetic resonance imaging (MRI) may be preferred over X-rays or CT scans to avoid any potential harm to the developing baby.

Timing of the examination

If radiography is necessary, it is generally recommended to perform it during the second trimester when the risk to the foetus is lower compared to the 1st trimester. However, if urgent imaging is needed, it can be done at any stage of pregnancy with proper precautions.⁷

Proper positioning

Ensuring proper positioning of the patient during the radiographic procedure is crucial to obtaining accurate images while minimizing radiation exposure to the foetus. This may involve using additional support or cushions to maintain the correct posture.

Image quality

Factors such as increased abdominal thickness and foetal movement can affect image clarity and accuracy. To overcome this, Use the lowest radiation dose necessary to obtain diagnostic images. This can be achieved by adjusting technical factors like exposure time, mA, and kVp.⁸

Communication with the patient

Radiation in diagnostic imaging can provoke feelings of anxiety and nervousness in pregnant women, and it is important to counsel these women prior to the examination. Communication with the pregnant patient is crucial throughout the process. Clear and transparent communication about the procedure, associated risks, and the precautions taken to minimize radiation exposure can help alleviate concerns and empower the patient to make informed decisions regarding their healthcare.

CONCLUSION

Overall, the key in radiography of pregnant women is to carefully weigh the risks and benefits, use appropriate safety measures to minimize radiation exposure, and

ensure clear communication with the patient to make informed decisions about their care. By addressing all these challenges thoughtfully and implementing appropriate safety measures, healthcare providers can ensure the well-being of both the pregnant woman and her foetus during radiographic procedures.

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