Rays of help

Benefits of using radiation in a medical procedure outweigh any potential risk

BY DR AYESHA SIDDIQUI

Procedures that use radiation are necessary for accurate diagnosis of diseases and injuries. They provide important information about the health of a patient and ensure appropriate care.

Physicians and technologists performing these procedures are trained to use the minimum amount of radiation necessary for the procedure—the ALARA (as low as reasonably achievable) principle.

Benefits from the medical procedure greatly outweigh any potential risk of harm from the amount of radiation used.

Radiation is part of our lives. Visible light is the most common type of radiation, and we use it for seeing things. There are also forms of invisible radiation in our environment that come from outer space and the small amount of natural radioactive substances that are on the earth—the air we breathe, the water we drink, the food we eat—and in our bodies. This is called natural background radiation. This is about 2.4 to 3 millisievert (mSv) per year globally.

The amount of X-ray or gamma radiation received by a patient during an examination or treatment procedure is known as the radiation dose. It is measured in the unit sievert (Sv). In diagnostic procedures the dose is a small fraction of a sievert and is measured in millisieverts (mSv).

To explain it in simple terms, compare the radiation exposure from one chest X-ray as equivalent to the amount of radiation exposure one experiences from our natural surroundings in 10 days.

Examinations such as ultrasonography and magnetic resonance imaging do not involve exposure to ionising radiation.

As with any aspect of medical care, knowing that a patient is or could be pregnant is an important information. When a pregnant woman is ill or injured, the physician will carefully select medications to avoid potential risks to the developing child. This is also true of X-rays. While the vast majority of medical X-rays do not pose a critical risk to a developing child, there is a small likelihood of causing a serious illness or other complication. The actual risk depends on the term of the pregnancy and the type of X-ray.

This is not to downplay the importance of safety considerations that are needed in any instance of radiation exposure. It is of utmost importance to achieve a reasonable balance between our understanding about radiation and the accompanying risks.

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Following are comparisons of effective radiation dose with background radiation exposure for some radiological procedures

Procedure	Approximate effective radiation dose	Comparison with natural background radiation	Additional lifetime risk of fatal cancer from examination
Chest X-ray	0.1msv	10 days	Minimal
X-ray extremity (hand /foot)	0.001msv	3 hours	Negligible
X-ray (spine)	1.5msv	6 months	Very low
IVP	3msv	1 year	Low
CT scan (head)	2msv	8 months	Very low
CT scan abdomen	15msv	5 years	Low
Coronary CT angiography (CTA)	16msv	5 years	Low
Mammography	0.4msv	7 weeks	Very low
DEXA-one densitometry	0.001msv	3 hours	Negligible
Intraoral X-ray	0.005msv	1 day	Negligible
Bone scan	4msv	1.5 years	Low
PET-CT	14msv	5 years	Low
PET-MRI	7 msv	2.5 years	Low