

Introduction

Repat Radiology offer a wide range of Medical Imaging services. These include General Radiography, Fluoroscopy, Angiography, Orthopantomography (OPG), Computed Tomography (CT) and Ultrasound. Aside from ultrasound procedures all the other procedures utilise X-rays (ionising radiation) which does carry a risk to patients undergoing such examinations. Ionising radiation may cause damage to the body's cells.

Legislation and Regulatory Requirements and Best Practice

In SA the use of ionising radiation for medical imaging is governed by:

- Radiation Protection and Control Act 1982; and
- Radiation Protection and Control (Ionising Radiation) Regulations 2000

With adherence to the:

- CODE OF PRACTICE Radiation Protection in the Medical Applications of Ionizing Radiation (ARPANZA)

This ensures **justification and optimisation** in all practices that involve exposure to ionizing radiation. This is practised at Repat Radiology.

Justification

This principle can be stated as follows: *“No practice involving exposures to radiation should be adopted unless it produces sufficient benefit to the exposed individuals or to society to offset the radiation detriment it causes.”*

Before a medical procedure involving exposure of an individual to ionizing radiation is approved or commenced, the procedure must be justified for that individual.

Initially a referring doctor assesses the need for the procedure and the diagnostic benefits against the potential risk before referring a patient

On presentation at Repat Radiology each request is again assessed by the Radiographers and Radiologists before the procedure is commenced.

Optimisation

This principle can be stated as follows: *“Radiation doses that arise from medical radiation exposures and those received by the public and occupationally exposed persons must be kept **as low as reasonably achievable** (ALARA principle), economic and social factors being taken into account.”*

Repat Radiology conducts annual Quality Assurance testing on all equipment and monitors doses associated with the various procedures to ensure the ALARA principle is maintained.

Background Radiation

Before considering the risk involved with radiation doses from medical imaging procedures it has to be pointed out that we are all constantly subjected to radiation all around us. This radiation from the soil, the air, plants, buildings etc. is called background radiation.

/// RADIATION DOSE INFORMATION FOR PATIENTS UNDERGOING MEDICAL IMAGING

The unit of measure of effective radiation dose is a Sievert (Sv) and this is used to estimate the overall potential risk from radiation.

Background radiation doses vary from country to country and at different altitudes and can range from 1 to 10 millisieverts (mSv - one thousandth of a Sv) a year. In Australia it is around 2 mSv.

In this context, while the radiation dose from medical imaging varies for each different procedure, in comparison it is still a small fraction of our lifetime exposure to background radiation.

Table 1 is a guide how the typical effective doses from the most common imaging procedures compare to background radiation.

Diagnostic Procedure	Typical effective dose (mSv)	Equivalent period of natural background radiation*	Risk of fatal cancer per examination**
X-Ray examinations			
Limbs and joints (except hips)	< 0.01	< 1.5 days	1 in a few million
Teeth (panoramic)	0.01	< 1.5 days	1 in 2 million
Chest (single PA film)	0.02	3 days	1 in a million
Cervical spine (neck)	0.08	2 weeks	1 in 200 000
Hip	0.3	7 weeks	1 in 67 000
Thoracic spine or abdomen	0.7	4 months	1 in 30 000
Barium swallow	1.5	8 months	1 in 13 000
IVU (kidneys and bladder)	2.5	14 months	1 in 8000
Barium enema	7	3.2 years	1 in 3000
CT head	2	1 year	1 in 10 000
CT abdomen/pelvis	10	4.5 years	1 in 2000

Table 1: Typical effective doses, equivalent periods of natural background radiation and lifetime fatal cancer risks from diagnostic medical exposures in the 1990's (figures from the National Radiation Protection Board)

Questions or Concerns

If you have any concerns or queries about a procedure that has been requested for you, please discuss with your referring doctor in the first instance. For further queries regarding radiation doses please contact Repat Radiology on 08 8275 1906.

References

EPA (SA) www.epa.sa.gov.au/radiation ARPANSA www.arpansa.gov.au
 RANZCR www.Ranzcr.edu.au IAEA www.iaea.org
 Queensland X-Ray www.qldxray.com.au HPA www.hpa.org.uk (formerly NRPB (UK))

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