Radiation Protection Information for patients and workers involved in Nuclear Medicine procedures


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Introduction

Exposures

- Patients
- Families
- Carers and comforters
- Medical
- Public
- Occupational

Nuclear Medicine (NM) procedures

Lack of knowledge
Unreliable information on media

Inadequate perception of radiological risk
• **2013/59 EURATOM Directive**
  Education in RP in medical exposures

• **Bonn call for action (IAEA + WHO, 2013)**

• **IAEA Safety Standards**
  RP information adjusted to the level of risk associated
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- **2013/59 EURATOM Directive**  
  Education in RP in medical exposures

- **Bonn call for action (IAEA + WHO, 2013)**
  Action 2: c) Implement harmonized criteria for release of patients after radionuclide therapy, and develop further detailed guidance as necessary.

  Action 4: Strengthen radiation protection education and training of health professionals in Medicine in the Next Decade

- **IAEA Safety Standards**  
  RP information adjusted to the level of risk associated
• National legislation:

| **RD 783/2001** | Education and training to professionals in the field of medical exposures is mandatory, both to exposed and non-exposed workers |
| **Ministerial Order 2006/04/21** | Medical Physics and Radiation Protection Department (MRPD) is responsible for this education |
| **RD 1841/1997** | Nuclear Medicine Department (NMD) and MRPD must provide the patient with information prior the procedure  
  • Written instructions in therapy procedures → ALARA |
OBJETIVE:

**Analysis and update** of the information and education in radiation protection provided to:

- patients undergoing nuclear medicine procedures
- and to the professionals who are somehow involved in the care of those patients
NMD of a University Hospital

- Diagnostic procedures

- Therapy procedures (3%)
  - Hyperthiroidism therapy (I-131)
  - Radioembolization therapy for liver cancer (Y-90)
  - Ra-223 treatment for metastatic prostate cancer

PATIENTS

Consultation:
oral + written information
HEALTH PROFESSIONALS

Training RP sessions to exposed workers

- Periodical and programmed
- Performed by MRPD according to national regulation
- RP requirements: - in daily practice - new techniques

Information sessions to non-exposed workers

- On demand
- Given by MRPD
- Answer to concerns → improving clinical practice
- Radioembolization therapy

Written protocols

- Available to any professional
- Elaborated by MRPD
- Manipulation of radioactive sources outside NMD
- Hospitalisation outside NM facility
PATIENTS

• Prior general information to patient

  Colaboration: NMD + MRPD + prescribers

  90% out of total diagnostic procedures Tc-99m → No further RP restrictions
PATIENTS

• Prior general information
  
  Collaboration: NMD + MRP
  
  90% out of total diagnostic procedures

What is Nuclear Medicine?
Nuclear Medicine is a medical modality in which diagnostic imaging and therapeutic procedures are performed using radioactive material.

What are the radiopharmaceuticals?
They are compounds which allow for studying the morphology and functionality of organs by its assimilation and emission of small amount of radiation. The equipment consists on a special camera (called gamma camera) which detects the radiation escaping from the patient’s body and creates pictures offering information about the location and distribution of the radiopharmaceutical. Nowadays, Computer Tomography (TC) is integrated in the majority of the gamma cameras.

How is the procedure performed?
Nuclear Medicine explorations are noninvasive procedures in which the necessary dose of radiation is administrated by, generally, intravenous injection of a radiopharmaceutical. A determined interval of time, which depends on the type of procedure, is necessary between the administration and the performance of the exploration; ranging from few minutes (10min) until several hours (5h) or even days (1-5d). Some procedures require several explorations during the same day and others even different days, you will be informed if this is your case. Due to those different intervals of time, some patients may be attended before you although they had reached the faculty later. Once that waiting time is finished, you will be addressed to the room where the gamma camera is placed and the exploration will be performed. During the exploration is extremely important that you stay motionless in order to obtain a good diagnostic image quality.

Do I need some preparation?
Generally not; in case you did need, you will be informed previously by the Nuclear Medicine Department. If necessary, you will also be asked for information about the medication you are taking.
PATIENTS

- Prior general information

Collaboration: NMD + MRPD + prescribers

90% out of total diagnostic procedures

Tc-99m → No further RP restrictions
PATIENTS

• **Prior general information to patient**

  *Collaboration: NMD + MRPD + prescribers*

  90% out of total explorations Tc-99m → No further RP restrictions

• **Hyperthyroidism therapy patients:**

  *Prior information about the treatment*

  + Post treatment recommendations *based on the dose rate* + working and living *conditions* of patients
PATIENTS

• Prior general information

 Collaboration: NMD + MRPD

 90% out of total of patients

• Hyperthyroidism therapy patients:

  prior information
  + post treatment recommendations
  based on the dose rate + working and living conditions of patients

PATIENT INFORMATION IN HYPERTHIROIDISM THERAPY IN NUCLEAR MEDICINE

What is Nuclear Medicine?
Nuclear Medicine is a medical modality in which diagnostic imaging and therapeutic procedures are performed using radioactive material. In hyperthyroidism therapy radioactive Iodine (I-131) is used.

What is radioactive iodine?
Stable Iodine is part of our usual diet, and it is uptaken in the thyroid gland. I-131 is a radioisotope of Iodine, which emits radiation and is used for medical purposes.

What does the treatment consist of?
Dose of I-131 is going to be administrated to you, in a capsule form. The dose will be concentrated in your thyroid gland. As a consequence, it will receive some radiation dose which will allow to reduce its activity and enhancing your symptoms. Due to the relatively small dose administrated, this is an outpatient treatment.

Do I need some preparation?
In case you are taking antithyroid medication, you must discontinue that medication within 5 days before the treatment.

What happens if I am pregnant or think I may be?
YOU MUST INFORM ABOUT IT TO THE NUCLEAR MEDICINE SPECIALIST BEFORE THE RADIOISOTOPE IS ADMINISTRATED.

What happens if I am breastfeeding?
YOU MUST INFORM ABOUT IT TO THE NUCLEAR MEDICINE SPECIALIST and you will have to discontinue breastfeeding during some period of time you are told.

May I be accompanied by people?
Yes, you may, but in NO case by children or pregnant women.
PATIENTS

- **Prior general information** to patient
  
  Collaboration: NMD + MRPD + prescribers
  
  90% out of total explorations

- **Hyperthyroidism therapy patients**: prior information about the treatment + post treatment recommendations based on the dose rate + working and living conditions of patients
### PATIENTS

- **Prior general information to patient**
  
  **Colaboration:** NMD + MRPD + prescribers
  
  90% out of total explorations Tc-99m → No further RP restrictions

- **Hyperthiroidism therapy patients:**
  
  prior information about the treatment
  
  + post treatment recommendations **based on the dose rate + working and living conditions of patients**

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**Distribution of information to patients has been improved**

✔ clear and reproducible format
HEALTH PROFESSIONALS

- **Radioembolization** therapy for liver cancer (Y-90)
  Training sessions for exposed workers: nuclear medicine + vascular radiology

- **Ra-223 treatment** for metastatic prostate cancer
  Training about RP and disposal waste for \(\alpha\)-emitters

- Information sessions for **non-exposed workers** in:
  - Nephrology Department (dialysis patients from NM)
  - Cardiology Department (stress tests of NM)
  - Endoscopy Department
  - Operating theatre
HEALTH PROFESSIONALS

- Protocols and procedures available at the MRPD and constantly updated

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**Object and scope:** Optimising healthcare professionals radiation protection during the period from the radioisotope Ga-67 administration through the exploration performance.

**H.U. La Princesa**

**Responsible:** Nuclear Medicine Department and Medical Physics and Radiation Protection Department.

**Method:** Excretion of this radionuclide is through urine and faeces.
**HEALTH PROFESSIONALS**

- Protocols and procedures available at the MRPD and constantly updated

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**Radiation protection standards during the 24 hours after the administration**

1. Handling patient’s urine shall be performed using gloves and long-sleeved gown. Once it is finished, gloves must be disposed.
2. In case the patient has a Foley catheter, the urine bag shall be emptied through the toilet tube while maintaining the tap open in order to increase the dilution.
3. Self-sufficient patients shall be indicated to urinate sat down and double flush the tank after urinating, washing their hands carefully.
4. Picking the faeces is not necessary
5. Gloves will be the only protection material for workers, in case they need to manipulate the urine of the patient.

Every nursing role is able to be performed.

Special care needs to be taken during the 6 first hours, optimizing the time spent close to the patient.

During the 6 first hours, it is recommended that an average distance superior to half a metre is kept by visitors.

Presence of pregnant women, both relatives and workers, shall be avoided wherever possible.

Dose received by cause of contact with those patients is very low, 11.9 complete days would be necessary to stay closer than 1 metre from the patient to overcome the 1 mSv dose limit established for public.

In case of questions or suggestions, please call Medical Physics and Radiation Protection Department 13154/13131
CONCLUSIONS:

- Information to patients prior to the procedure
- RP requirements for individual patients in therapy procedures after the treatment according to dose rate and social conditions
- Education and training of health professionals

- Improve risk understanding (patients and also carers and comforters)
- Reduce radiation exposures and implies better quality and life conditions for patients and family.
- Care of nuclear medicine patients outside NMD improved
Thank you for your attention

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