

Risk Assessment in a Nuclear Medicine Department

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The Aims:

1. Risk Assessment in a Nuclear Medicine Department
2. Demonstrate the importance of a HST in a Nuclear Medicine Department

Agenda

1. Nuclear Medicine and the Physicist role
2. Risk Assessment
3. Conclusions

Nuclear Medicine

- ① Diagnostic and Therapeutic technique
- ① Safe and painless technology
- ① Produces images of body organs, allowing its visualization
- ① Scintigraphic images that are based on the ability to detect gamma radiation emitted by radioactive materials.

Nuclear Medicine – Main Equipment



Gama-Camara

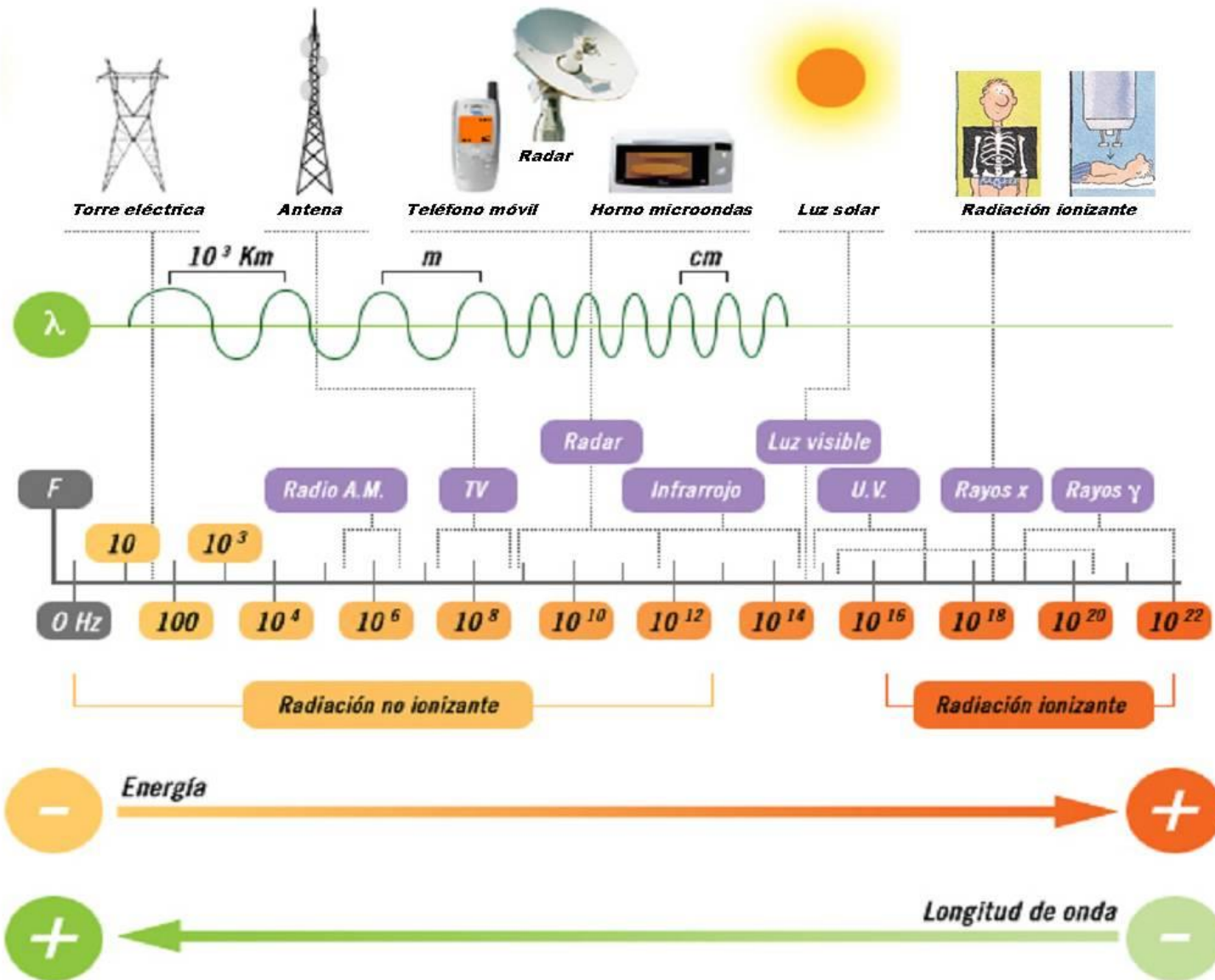


**Laminar Flow Camera -
Radiopharmacy**

Nuclear Medicine

Ionizing Radiation – I.E.: Gamma and X radiation
(Enough energy to turn atoms and molecules into charged particles)

Non Ionizing Radiation – I.E.: Visible or Infrared light.
(Not enough energy for this transformation)



Electromagnetic Spectrum

Nuclear Medicine – Main Associated Risks

Radioactive Exposure Risk: act or condition of being subject to irradiation by radioactive sources or radiation emitting equipment.

Nuclear Medicine – Main Associated Risks

Radioactive Contamination Risk: may be external, when there is deposition of radionuclides on the outer surface of the body; or internal, as radionuclides enter the body through any route (inhalation, ingestion, wounds, etc.).

Nuclear Medicine – Main Associated Risks

Biological Effects: depend on the nature and intensity of the radiation and the affected organ or tissue.

Nuclear Medicine - Physicist

- Patient and other professionals protection regarding the safety application and use of radiation;
- Establishing adequate protocols to ensure low radiation for patients and others;
- Maintenance and characterization of radiation;

Nuclear Medicine - Physicist

- Procedures to ensure image quality;
- Development and implementation of quality assurance program;
- Assistance to other health professionals in the application of radiation, taking into consideration their risks and benefits

Risk Assessment

Identify, estimate and assess the risk to the safety and health of Nuclear Medicine workers, taking into consideration its severity and probability, to obtain the necessary information for making decisions on the preventive measures that need to be taken.

Risk Assessment Method Used -
MARAT

Risk Assessment - Checklists

Activity	Task
1. Radioactive materials handling (radiopharmaceuticals)	1.1. Radioactive materials handling (radiopharmaceuticals)
	1.2. Storage of the produced radioactive waste
	1.3. Procedures in patient admission
	1.4. Organization of reports relating to the examinations
2. Radiopharmaceuticals injection in patients	2.1. Patients monitoring
	2.2. Injection of radiopharmaceuticals in patients
3. Procedures in injected patients area	3.1. Procedures in the area reserved for injected patients
4. Image acquisition and processing procedures	4.1. Image acquisition
	4.2. Image processing
5. Cleaning	5.1. Cleaning with use of chemical agents
	5.2. Working with cleaning machines

Risk Assessment - Results

Activity 1	Danger	Associated Risk	Damage/Effect	Control Measures
Task 1.1 Handling produced radioactive substances	RF Preparation and Quality Control.	1. Radiation Exposure. 2. Skin contact with chemicals 3. Objects falling during handling.	1.Cancer diseases, skin diseases, headache 2.Chemical burns ,dermatitis. 3. Multiple lesions	- Sink with hot and cold water. - Radiation Protection Plan - Procedure for carrying out the task.
Task 1.3 Patients Admission	1. Working with monitor 2. Stress Situation 3. Working with phone	1. Eye movements 2. Mental Fatigue 3. Elevation shoulder with cervical tilt	1. Visual Fatigue, headache 2. Headache, psychosomatic disorders 3. Musculoskeletal Disorders	- Organization of conducting health surveillance in NM department - Hands free devices. Avoid the posture of shoulder elevation with cervical inclination to hold the phone.

Risk Assessment – Result Analysis

Tasks that involve greater risk and some corrections to do:

- 1. Risks associated with ionizing radiation exposure:** Correction Measures - implement a radiation protection plan, written procedures for the tasks organization and execution, enhanced medical surveillance, acquisition and provision of appropriate Personal Protective Equipment.

Risk Assessment – Result Analysis

2. Ergonomic Risks:

Corrective measures / improvement -
enhanced medical surveillance, use of
hands free devices and implementation of
written procedures for tasks organization
and execution.

Risk Assessment – Result Analysis

3. **Biological and chemical Risks:**

Corrective Measures - There are several measures to be implemented, including the use of appropriate PPE, training or enhanced medical surveillance.

Conclusions

Physical risks are the most significant, particularly for activities involving contact with ionizing radiation, such as the handling and storage of radioactive substances, RF injection or acquisition and processing of images in gamma-camera. The limited health surveillance and the absence of a written plan of radiation protection greatly increases this type of risk.

There are also ergonomic, chemical and biological hazards, which cannot and should not be devalued.

Conclusions

Biological Risks - Exposure to Biological Agents is a permanent risk for any health service. Can lead to infections or, in more severe cases, HIV or Hepatitis B or C.



RF Injection

Conclusions

Chemical Risks - Contact with
Chemical agents can cause burns or
dermatitis.



Handling radioactive substances;
Cleaning

Conclusions

Ergonomic Risks - headache, visual or hearing fatigue, musculoskeletal disorders, and others may occur.



Administrative work; Patients Monitoring and Positioning in Gamma-Camera.

Summary

1. Nuclear Medicine and Physicist role
2. Risk Assessment
3. Conclusions

Bibliography

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