Radiation Protection in the Daily Practice of Radionuclide Therapy

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While performing radionuclide therapy procedures it is important for the the staff of nuclear medicine departaments to be well-trained and advised of the basic principles by which irradiation dose can be reduced. Radiation protection main target is to achive a dose as low as resonably achivable (the ALARA principle) for all categories of individuals involved in procedures where ionising radiation is used [1].

In order to respect radiation protection principles, all recomandations and legislation, in all radionuclide therapy departaments, internal rules, protocols and guidelines must be followed.

In a nuclear medicine department where metabolic radionuclide therapy is performed nuclear medicine technologists are involved from the beginning the procedure to the end of it. Preparation of radiopharmaceuticals, informing patients regarding the procedures and administration of the therapeutic radionuclide are all tasks from the daily practice of a nuclear medicine technologist. The observation of personnel exposure is very important and all members of the staff should wear personal dosimeters and be monitored in order to ensure that the limits established by national regulations are respected.

As nuclear medicine technologists, in order to reduce the radiation exposure to their own benefits and that of the other members of the medical team from a radioactive source it is necessary to know and take in consideration some physical factors. The time spent near a radioactive source has to be as short as possible. All information and documentation should be obtained from the patient before the procedure. It is mandatory to provide to the patient all necessary information about the whole procedure and to ensure that the patient understands all aspects of the procedure and has no further questions and doubts to avoid the unnecessary exposure of the staff from radioactive patients [2].

The distance between the radioactive source and the operator should be maximized by using handling tools devices and keeping a safe distance from radioactive sources or patients [2].It is also required to ensure an adequate distance from radioactive patients and another people by using separate circuits.

Another important parameter in minimising iradiation exposure is using appropiate shielding devices while manipulating radioactive sources. Most therapeutic radiopharmaceuticals are beta (β) emitters so the best way to shield the source is using Perspex. When high activities in therapeutical admnistration are used or when in addition to β particles, the radionuclide emits gamma (γ) photons, it is useful to have mixed shielding from Perspex and lead [3].

When unsealed radioactive sources are manipulated it is important to avoid potential contamination. To minimize the risk of internal or external contamination it is required to wear gloves and a protective coat when entering in controlled areas and during the preparation and administration of radiopharmaceuticals.

The radiation exposure of nuclear medicine staff may be determined when radiopharmaceuticals are manipulated for preparation and administration, when health care is provided in emergency situations after the patient has been irradiated or when accidental contamination occurs. Taking in consideration that all protocols and guidelines are respected and well-trained nuclear medicine technologists will perform procedures more quickly and with a lower likelihood of accidents, the irradiation dose for the medical team decreases.

References:

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