

OPTIMIZATION OF RADIATION PROTECTION (ORP) OF WORKERS IN NUCLEAR MEDICINE DEPARTMENT OCCUPATIONALLY EXPOSED TO IONIZING RADIATION

Ana Ugrinska¹, Biljana Crcareva¹, Boris Andonovski¹

¹ Institute of Pathophysiology and Nuclear Medicine, Vodnjanska 17, Skopje, R. Macedonia,
ugrinskaana@yahoo.com, biljanacrcareva@hotmail.com, boris@ukim.edu.mk

Abstract – Occupational radiation exposure of nuclear medicine personnel arise either from external irradiation during the handling or from the entry of radioactive substances in the body; the major source of external irradiation is the patient that has received a radiopharmaceutical for diagnostic or therapeutic purposes. In this study we present the dosimetry monitoring of the personnel at the Institute of Pathophysiology and Nuclear Medicine in Skopje (IPNM) before and after the implementation the methods of ORP.

Twenty-seven employees were comprised within the study. They were monitored monthly with TLD, and the results of reading were expressed as whole body personal dose equivalent $H_{p(10)}$ in the period of use of dosimeter. Annual Effective Doses (AED) are presented for years: 2001, 2004, 2005, 2006, 2007, 2008. In the year 2005, after measurement from Technical Service Organization, IPNM Radiation Protection Officer (RPO) designed and implemented new recommendation and modality such as: designation of areas, introducing ambient dose measurements, classification of employees, personnel rotation, risk assessment, occupational dose constraints, education of personnel, compliance with written procedures and establishing the Programme for Radiation Protection (RP). ORP measures were applied during the year of 2006, so the results of 2001, 2004 and 2005 correspond to unoptimized RP.

We evaluated three groups: radiopharmacy laboratory staff (RPL), nuclear medicine technologists (NMT) and medical doctors. The third group was further divided according to the AED in group with AED below 1.6 mSv (MD1), and group with AED above this level (MD2). The average AED in the NMT group for 2005 was 3.59 mSv, while in 2008 it was 1.8 mSv; for MD1 group in 2005 was 1.5 mSv and in MD2 was 3.0 mSv. The average AED in 2008 for MD1 was 1.1 mSv, while MD2 group comprised of only one subject with annual effective dose of 1.76 mSv. The most exposed groups were nuclear medicine technologists (NMT) and medical doctors routinely involved in everyday nuclear medicine procedures (MD2).

The results from our study clearly show the reduction of external radiation dose at the IPNM after establishment of ORP measures in 2006. The reduction was most significant in the groups that had the highest radiation burden.