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Assessment of equivalent doses for the eye lens for the workers in two St. Petersburg nuclear medicine departments

INTRODUCTION

In 2011 the International Commission on Radiation Protection established the threshold value of the absorbed dose in the eye lens for the development of cataract equal to 0.5 Gy for acute and chronic exposure. A dose limit for exposure of the lens of the eye was established equal to 20 mSv per year, averaged over five consecutive years (100 mSv over 5 years), and 50 mSv for any single year [1].

Workers of nuclear medicine departments can receive high doses in the eye lens [2]. Previous studies show that the measured Hp(3) of the eye lens of the staff involved in the production of radiopharmaceuticals for positron emission tomography (PET) were higher up to a factor of 3 compared to the Hp(10) measured on the chest[2].

The aim of the study was to assess the absorbed doses in the eye lens of the staff of medical facilities working with radiopharmaceuticals and to estimate the relationship between the dose in the eye lens and the activities of the radionuclides in order to determine categories of the staff for regular individual monitoring of the eye lens doses in nuclear medicine departments.

MATERIALS AND METHODS

Individual dose equivalent of the eye lens Hp(3) of the staff was measured in two medical facilities in St. Petersburg during one month. The staff was divided by two groups depending on the used radionuclides (Table 1).

The Hp(3) in the eye lens were measured with individual thermoluminescent dosimeters (MKD-A with detectors made of LiF: Mg, Ti (DTG-4). The uncertainty of the measurements Hp(3) was ± 30% (P=0.95). Conversion coefficient from Hp(3) to equivalent dose of the eye lens was 1.

RESULTS AND DISCUSSIONS

The highest equivalent doses in the eye lens (1.3 mSv) were determined for technologists from the first group involved into the synthesis of radiopharmaceuticals for PET (Figure 1). Relatively high equivalent doses were determined for radiochemists involved in the synthesis and quality control of radiopharmaceuticals for PET (0.76 mSv). The doses of nurses in PET engaged in dispensing of radiopharmaceuticals in syringes, measurement of the activities and injection to the patient (0.55 mSv) were higher compared to doses of nurses working with 99mTc, 123I and 89Sr (0.34 mSv). The analysis showed a high correlation between eye lens doses of nurses and radiochemists working in PET and activity of radionuclides; there was no correlation for other groups.

CONCLUSION

High doses were determined for the nurses, radiochemists and technologists working with positron-emitting radionuclides (18F, 68Ga and 11C), which can exceed 20 mSv in a year. It is recommended for this category of workers to perform individual monitoring of the eye lenses after a preliminary assessment of the level of exposure of workers and an assessment of the risks of high doses of the eye lens.

REFERENCES

1. IAEA. Radiation protection and safety of radiation sources: international basic safety standards, International Atomic Energy Agency, Vienna (2014).

2. Kubo, A.L.S.L., Mauricio, C.L.P. TLD occupational dose distribution study in nuclear medicine, Radiation Measurements 71 (2014) 442 –446.

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