The treatment results were analyzed depending on the dose administered, as well as the dose distribution of the D90 value in patients, depending on the result of treatment. The research of the distribution of the D90 dose value by the number of patients (Figure 1) and the statistical characteristics of the D90 value (Table 1) show that the average dose delivered to the tumor was 84.25 Gy.

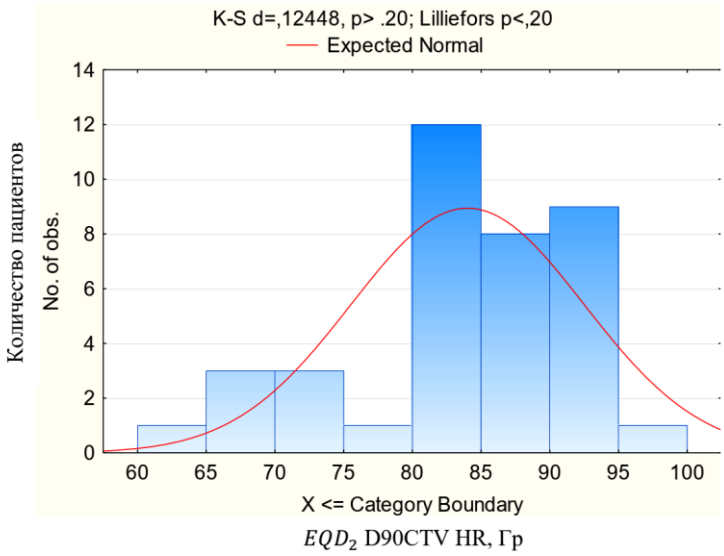

Fig. 1. – Dose distribution of D90 by patients

Table 1

Statistical characteristic of the D90 value

Total number of patients	183
Average dose, Gy	84,25
Minimum dose, Gy	61,20
Maximum dose, Gy	102,60
Standard deviation, Gy	7,22

The average doses received for the bladder, rectum and sigmoid colon for patients with complications were 87.4, 63.8 and 69.2 Gy, respectively. The total number of complications from critical organs was less than 5 %, which corresponds to the results of leading cancer centers in Europe and the USA [1].

BIBLIOGRAPHY

1. *Akila, N.* American Brachytherapy Society consensus guidelines for locally advanced carcinoma of the cervix. Part II: High-dose-rate brachytherapy / N.Akila [et al.] // Brachytherapy – 2012. – Vol. 11, № 1. – P. 47–52.

STATE OF RADIOACTIVE POLLUTION OF WATERBODY ECOSYSTEMS OF THE CHERNOBYL EXCLUSION ZONE BY BASIC DOSE-FORMING RADIONUCLIDES

H. Skibinskaya, T. Dashkevich

Belarusian State University, ISEI BSU,
Minsk, Republic of Belarus
skopets.0804@gmail.com

The severity of a radionuclide pollution impact on the environment and living organisms depends not only on the radionuclide concentration but also to a great extent on the biological effect of ionizing radiation accompanying radioactive decay. The biological effects of radioactive pollution of the environment are determined by the radiation exposure doses living things receive, which in turn depend on the content, accumulation, fixation strength, and elimination rate of radionuclides from the components of aquatic ecosystems. The study of aquatic

ecosystems contaminated with technogenic radionuclides (Cs-137, Sr-90, etc.) as a result of the Chernobyl accident is of particular interest.

Keywords: radionuclide, strontium, radioactive contamination, specific activity.

As a result, of the Chernobyl accident, the radioactive contamination of aquatic ecosystems has become a permanent factor. Over the period from 1992 to 2018, various studies were carried out to determine the activity of Sr-90 and Cs-137 in the following main ecosystem components: water, bottom sediments and aquatic vegetation of the Perstok lake, Borschevsky flooding, and Pripyat creek (near the Krasnoselye village), located in a 15-kilometer Chernobyl exclusion zone.

Considering the above water bodies, radionuclides are distributed extremely unevenly among ecosystem components. Their main concentration is recorded in bottom sediments. In the Perstok Lake, the activity of Cs-137 and Sr-90 in bottom sediments is 6551 and 2595 Bq/kg dry weight, respectively; in Borschevsky flooding - 3062 and 165 Bq / kg dry weight, respectively. In the Perstok Lake, volumetric water activity on Cs-137 is 13.9–19.3 Bq / l, and on Sr-90 – 3.1–13.4 Bq / l. It has been established that a significant impact on the activity levels of radionuclides in various components of standing aquatic ecosystems is exerted by their migration in the directions of "bottom sediments ↔water ↔ biota".

The main dose-forming radionuclide of greatest interest is Sr-90. The following methods can be employed to determine the Sr-90 content in objects of aquatic ecosystems:

1. Using chromatographic columns and a Tri-Carb liquid scintillation counter radiochemical analysis.
2. Using a semiconductor detector.
3. Using a scintillation detector.

Using both radiochemical and spectrometric methods allows the most accurate assessment of Sr-90 specific activity in the objects of aquatic ecosystems in the territories exposed to radioactive contamination.

BIBLIOGRAPHY

1. *Gudkov, D. I.* Distribution of radionuclides among the main components of lake ecosystems in the exclusion zone of the Chernobyl NPP / D. I. Gudkov [et al.] // Radiation biology. Radioecology. – 2005. – T. 45, No. 3. – P. 271–280.

2. *Golubev, A. P.* Dynamics of radioactive contamination of ecosystems of different types of water bodies in the Belarusian sector of the exclusion zone of the Chernobyl NPP / A. P. Golubev [et al.] // Radiation biology. Radioecology. – 2007. – T. 47, № 3. – P. 322–332.

3. *Evdokimov, V. N.* Long-term dynamics of radionuclides in the bottom sediments of Lake Perstok (10-km Chernobyl zone) / V. N. Evdokimov, K. M. Kireenko, V. S. Piskunov // Ecological problems of Polesye and adjacent territories. – Gomel, 2000. – P. 34–35.

DEVELOPMENT OF THE «DETERMINATION OF SPECIFIC ACTIVITY OF ORGANICALLY BINDED TRITIUM IN WATER» PROJECT METHODOLOGY

H. Skibinskaya, V. Mironov

Belarusian State University, ISEI BSU,
Minsk, Republic of Belarus
skopets.0804@gmail.com

In recent years, not only tritium oxide (HTO), but also organically bound tritium (OBT) with high dose coefficients has been standardized in sanitary norms and rules. Currently, the measurements of organically bound tritium in drinking water are not carried out due to the lack of methodology. Therefore, the development of a methodology for the determination of organically bound tritium in drinking water is an urgent task. [1].

Keywords: radionuclide, tritium, organically bound tritium, tritium oxide.

Organically bound tritium presents more serious risk factors than tritium oxide for a number of reasons. One of the main reasons is that organic bonded tritium has a four times higher clearance than tritium oxide. The studies show that a half of tritium oxide is excreted every 10 days, the OBT excretion rate being about 40 days [1].

The content monitoring of organically bound tritium in water bodies taking into account its possible physicochemical forms and properties is especially relevant for solving the problems of ensuring radiation safety of the population and the environment during the operation of the Belarusian NPP.