Intensive development of chemical production leads to the emergence of a wide range of consumer products on a polymer basis. To give the polymer soft and flexible properties, manufacturers use phthalic acid ester – diisononyl phthalate (DINP), whose dangerous properties have not been studied for humans. It is known that phthalates are endocrine effectors and, in particular, are able to exhibit antiandrogenic properties. One of the components of the study of the negative effect of the chemical factor is the identification of the hazard in experiments on laboratory animals. The results of the study are necessary for the development of a hygienic standard for the allowable amount of migration of DINP from medical devices for the purpose of assessing their safe use when conducting the procedure for state registration by sanitary inspection bodies.

A study of the influence of DINP on the reproductive function of white rats, taking into account the changes occurring in postnatal development and the determination of inactive dose levels.

The experiments were carried out on 105 randomly-mature adult female rats (160–180 g) according to a combined scheme for studying embryotoxic and teratogenic effects, taking into account the state of offspring in the postnatal period. Selected females, distributed in 5 groups of 21 individuals, from the first day of pregnancy, were intravenously injected with DINP at fixed doses of 10, 100, 1000 and 10,000 mg / kg throughout the gestation period (2 ml of distilled water were administered to the control group). At the end of organogenesis on the 20th day of pregnancy, 11 of 21 females in each group were sacrificed. The presence of anomalies in the development of the internal organs of embryos was determined using the sagittal section method. The remaining females brought offspring, in males whose weight and body length were determined upon reaching the age of three months, the relative coefficients of mass of appendages and testes, the mobility and concentration of spermatozoa were examined.

The study found that intragastric administration of DINP to females during the pregnancy period at doses of 100, 1000 and 10,000 mg / kg initiated a dose-dependent formation of external and internal malformations of embryos such as microphthalmia, anencephaly, hydrocephalus, akronia, micrognathia, hypoplasia of the lung, absence an interventricular septum of the heart, an intestinal and / or liver event. The exposure level of 10,000 mg/kg is characterized by an increase in total postimplantation and embryonic mortality, the presence of multiple (combined) malformations of embryo development. At the same time, there were no significant changes in the postnatal development of the offspring.

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DVANTAGES OF USING LINEAR ACCELERATORS OF NEW GENERATION FOR RADIATION THERAPY OF TUMORS

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Nowadays, radiation therapy along with chemotherapy and surgical treatment, takes a leading role in the fight against cancer. Modern radiation oncologists have a wide range of possibilities to save many lives using linear accelerators, and in cases where this is not possible, significantly extend and improve the quality of life of patients. Medical linear accelerators of the new generation have become the main type of apparatus used in radiotherapy of oncological diseases, gradually replacing not only gamma therapeutic devices with cobalt 60 sources, but older electron accelerators as well. Such a widespread distribution of the new generation linacs, despite the high cost, can only happens because of the high quality of ongoing treatment for cancer patients.

Keywords: radiation therapy, stereotactic treatment, radiosurgery, linear accelerator, quality control.

Nowadays, the clinical effect of radiotherapy is largely determined by using of modern and high-technic medical radiotherapy equipment. One of such equipment is the medical stereotaxic linear electron accelerator of the new generation of TrueBeam STx, which was installed in 2017 in N. N. Alexandrov National Cancer Center of Belarus. This linear accelerator is equipped with a system of integrated visualization of anatomical structures of the patient position, including computed tomography technology in a conical beam; robotic therapeutic table allows automatic patient positioning with six degrees of freedom; system of dynamic synchronization of the radiation mode of the accelerator with the respiratory cycle of the patient. The main feature of TrueBeam STx is the ability to deliver high values of absorbed dose in the shortest time.

This is achieved by using FFF (Flattening Filter Free photon beam) technology with a dose rate of 24 Gy/min. Due to this option, the patient's irradiation time is greatly reduced, which not only makes the procedure of radiation therapy more comfortable for them, but also significantly reduces the probability of changing the position of the tumor during irradiation, which is the main mark of the efficiency of this technology. Also, the design feature of this device is a multi-leaf collimator (MLC) with a high resolution in the formation of an individual irradiation field. This MLC represents a new generation of devices with a minimum plate thickness of 2,5 mm, which makes it possible to apply the stereotactic and radio surgical irradiation technique without using an additional tubes, compensators and contributes to the most comfortable course of the radiotherapy session.

Along with expanding services of therapeutic procedures for radiotherapy in patients with cancer, TrueBeam STx also provides a wide range of quality control technologies for accelerators' systems. One of the advanced technology is «Machine Performance Check», which automatically performs the quality control of the main parameters of the system and significantly reduces the time for daily and weekly quality control and calibration procedures both the output parameters of the radiation beam and the geometric characteristics of the accelerator.

Thus, the new-generation medical accelerator TrueBeam STx in N.N. Alexandrov National Cancer Center of Belarus is used and provides quality medical care to cancer patients according the most modern methods of stereotactic and adaptive radiotherapy in the world.

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RADIATION MONITORING FOR DOSE ASSESSMENT OF REPRESENTATIVE PERSON

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Currently the ICRP recommends using the dose of representative person for radiation protection purposes. However, there are still no strict methodological approaches for the dose assessment of the representative person all over the world. The purpose of this research is to analyze some methodological approaches for the assessment of population doses for radiation protection based on modern international recommendations and adapting international approaches to the conditions of the Republic of Belarus, taking into account the situations of existing and planned exposures. The focus should be on the environmental radiation monitoring for the assessment of external and internal (with food) population doses.

Keywords: representative person, dose assessment, environmental radiation monitoring.

Population dose cannot be measured directly without a considerable difficulty. In most cases, it cannot be measured at all. Therefore, for the purpose of protection of the public, it is necessary to characterize an individual receiving a dose that is representative of the most highly exposed individuals in the population.

The International Commission of Radiological Protection (ICRP) has previously used the concept of the critical group for defining those people who receive the highest exposures from a particular source or set of sources of radiation for the purposes of applying its recommendations [1]. Dose restrictions have been applied to the mean dose in the appropriate critical group. Over the past decades, a considerable body of experience has been gained in the application of the critical group concept. There have also been developments in the techniques used to assess doses to members of the public, notably the increasing use of probabilistic techniques. The adjective 'critical' has