

**Materials and methods:** we studied the frequency of breast cancer in the region of the Semipalatinsk nuclear test site in view of the radiation risk zones in comparative perspective (for the period 1971–2011, according to data provided by the Department of Health of the former Semipalatinsk and Eastern Kazakhstan Province).

**Research results:** throughout the period analyzed, the incidence of breast cancer had a significant upward trend. The cumulative value increase from 1971 and 2006 amounted to 5 times (from 5,2 to 26,2 per 100,000 people a year). From 2006 to 2011, no significant changes in the incidence have been identified. Throughout the study, trend indicator was directed upward, indicating a continuing trend to its further increase.

There were significant differences in the radiation risk zones. The peculiarity of this indicator in the area of extraordinary radiation risk is a significant excess of its average value for the region and the republican average, existing throughout the whole period of study. A similar but less pronounced trend was found in the zone of maximum radiation risk.

The main feature of breast cancer incidence in the area of minimum radiation risk is its gradual growth, generally corresponding to the average national rate trends.

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The work was submitted to International Scientific Conference «Development of scientific potential of higher education», UAE (Dubai), March, 4–11, 2014, came to the editorial office on 11.02.2014.

#### VASCULAR ENDOTHELIUM DISORDERS AT THE MALIGNANT TUMORS AND CHRONIC IONIZING RADIATION

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Malignant neoplasms of rectum are among the most common diseases. Despite the relative simplicity of the diagnostics, the possibility of hidden course and frequency of metastasis causes significant frequency of inoperable forms undergoing conservative treatment (radiotherapy and chemoradiotherapy). In most cases, patients have systemic complications of oncological process, manifested by thrombosis and suppression of the immune system with a predisposition to infectious processes. Although the genesis of these complications has been studied for a long time, it has not been fully explored yet. State of the vascular endothelium is relevant as a potential modifying factor in the genesis of malignant neoplasm complications in persons exposed to ionizing radiation during their lifetime (due to the activity related to SNTS – Semipalatinsk Nuclear Test Site).

**Objective:** To determine the characteristics of endothelial factors in colorectal cancer in people subjected to the effect of ionizing radiation.

**Materials and methods:** two groups of people with colorectal cancer malignancies + control group. Methods of endothelial function study: the content of exfoliated (circulating) endothelial cells in peripheral blood; the content of NO metabolites (NO met.) in the blood; endothelium-dependent vasodilation definition (EDVD).

**Research results:** there were revealed statistically significant differences in terms of the circulating endothelial cells content in peripheral blood between the groups. The excess over the control group was the most pronounced (M2M1 = 2,23; M3M1 = 3,40). Excess of this indicator in patients with radiation history proved to be significant (M3M2 = 1,53). We can suggest the likelihood of vascular endothelial lesions in exposed individuals before the onset of tumors or that aggravating the effect of tumor process on the state of endothelial cells. Content of NO metabolites in the blood of the examined patients was increased; its average values in the group of irradiated patients were lower than those in the comparison group (M2M3 = 1,08). Given the important role of NO in the regulation of aggregation and spontaneous platelet disaggregation process, it must be assumed that the relative decline could play a role in the sharp decrease in the disaggregation activity.

According to the mean values of EDVD degree, M1M2 differences amounted to 1.46, M1M3 = 1,96 and M2M3 = 1,34. Thus, all obtained instrumental and laboratory data confirmed the presence of endothelial dysfunction in patients with malignant tumors of the colon and rectum and its greater degree in those with a history of chronic ionizing radiation.

Thus, signs of endothelial dysfunction, reduced endothelium-dependent vasodilation and increased amount of circulating endothelial cells in the blood levels is common to both groups of patients examined, with and without ionizing radiation exposure history. There are differences between the groups of patients depending on the effects of ionizing radiation. The exceeding extent of vascular endothelium damage regularly appeared in individuals with malignancies, previously exposed to radiation as a result of living in areas of SNTS radiation risk.

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The work was submitted to International Scientific Conference «Development of scientific potential of higher education», UAE (Dubai), March, 4–11, 2014. came to the editorial office on 11.02.2014.

#### THE CANCER INCIDENCE IN SEMEY REGION OF KAZAKHSTAN REPUBLIC

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The problem of morbidity and mortality from cancer is one of the most topical problems in modern medicine, as it affects the interests of all

mankind. WHO predicts that by 2020, the morbidity and mortality from cancer will increase by 1,5–2 times worldwide. The Republic of Kazakhstan is characterized by a similar trend of cancer incidence growth, taking into account the welfare and life expectancy, as well as increased detection of malignant tumors with the introduction of early detection programs. Mortality from cancer in Kazakhstan ranks second in the structure of mortality; about 17,000 people, of whom 42% are people of working age, die of cancer each year. During the last twenty years, the absolute number of cases of malignant neoplasms in the Republic has increased: in 1998 there were reported 28,322 diseased persons, whereas by the end of 2011, their number had risen to 30,299. The annual growth in the number of patients with malignant neoplasms is 5%. Mortality from malignant neoplasms in the last twenty years has decreased from 130,8 per 100 thousand people in 1998 to 101.6 per 100 thousand people in 2012. Reduction in mortality is associated, primarily, with the improved diagnosis of malignant tumors in the early stages and the effectiveness of outcomes.

We studied the incidence of malignant neoplasms in the population of Semey region of East Kazakhstan Province during the past 20 years.

The average annual intense incidence rate of malignant neoplasms by periods has increased from 200,6‰ (1991) to 216,8‰ (2012). To a greater extent, the maximum increase in incidence of Semey region (EKP – East Kazakhstan Province) for 1991–2012 was caused by increased risk of illness, marked in lung, breast and stomach cancer, colorectal cancer, malignant tumors of the skin and cervix.

Incidence of malignant tumors in the Semey region in 1991 in males was 126,5‰, in females – 163,8‰; the year of 2012 showed a trend toward increasing – 213,2‰ and 220,2‰/0000. In this case, the leading positions in the structure of incidence among men are occupied by tracheal, bronchus and lung tumors – 22,7% (1991–26,9%), and gastric tumors – 15,1% (15,0%); colorectal cancer in males moved to the 3<sup>rd</sup> position – 9,3% (5,6%), displacing the incidence of esophageal and skin cancer – 6,9% (7,0%); followed by 6,4% (3,8%) incidence of hematological malignancies and malignant tumors of the prostate gland – 5,1% (0,9%).

The first place on the prevalence of cancer in the female population belongs to breast neoplasms – 22,0% (1991 – 13,3%), second and third place is occupied by cervical cancer – 11,9% (2,6%) and colorectal cancer – 9,6% (6,7%), surpassing the malignant skin neoplasms – 8,2% (11,8%), stomach cancer – 6,4% (11,1%) and hematological malignancies – 6,4% (3,9%).

Thus, the analysis of morbidity and mortality from malignant neoplasms shows a tendency to their overall growth. It is well established that lung cancer in Semey region consistently ranks first in morbidity and mortality mainly in the male working population, which has socio-economic importance.

A persistent increase in tumors incidence of the gastrointestinal tract is observed. Breast cancer is one of the most frequent causes of death in women as compared with other forms of cancer.

The work was submitted to International Scientific Conference «Development of scientific potential of higher education», UAE (Dubai), March, 4–11, 2014, came to the editorial office on 11.02.2014.

#### THE EXPERIMENT OF CREATION OF BONE ANATOMIC PREPARATION FOR CRANIOMETRY FOR SCIENTIFIC PURPOSES

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**Purpose:** To determine and choose the most suitable method of creation of the bone preparation in scientific laboratory setting.

**Material and methods:** 5 fetuses corpses (16–20 weeks) were provided by the maternity ward «Municipal Hospital № 1» in Severodvinsk. The creation of skull preparation was based on a simple maceration method in the scientific facilities of the Department of Human Anatomy of the Northern State Medical University. The study design was reviewed and approved by the local ethics committee of NSMU (protocol № 02/3-13 on 20/03/13).

**Results:** Preparation of skeletons with preserved ligaments of embryos, newborn and early-age children requires special equipment and skills. After analyzing the literature, some methods, which are based on using of special thermostats and the involvement of additional microorganisms, were excluded. The most suitable method of creation of bone preparations in this case was the way of maceration, i.e. maintaining the bones for a few months in the warm water in a closed vessel. Corpses used in this experiment were previously fixed in formalin, and therefore, they were previously briefly immersed in a weak solution of hydrochloric acid prior to maceration. Then the preparations were immersed in warm water in a vessel covered with a lid for access of air. After 4 weeks sawdust were added into the water to improve the decay. During next 3 weeks the process of maceration was extremely slow, so we mechanically cleared skulls from the soft tissues without damaging the bone. Then preparations were put in warm water with sawdust again to complete the process of decay. 28 days later the preparations were washed with running water and were put into a 20% solution of hydrogen peroxide for bleaching. The result was obtained in one day.

**Conclusion:** As a result, we got the high quality fetal bone preparation for craniometry using the maceration, in scientific laboratory setting. This