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Short Communication

Radiation-induced pathology of the tissues of the oral cavity.

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It is noted that the presence of neglected and long-term untreated periodontitis can lead not only to the aggravation of dental problems, in the form of complicated caries, loss and loss of teeth, but also to an increased risk of gastrointestinal diseases and diseases of the cardiovascular system. [1] It should be recognized that the literature data on post-traditional changes in the oral mucosa are generally sporadic. Thus, in the publications of Belarusian scientists after the accident at the Chernobyl nuclear power plant, frequent lesions of the mucous membrane in the form of dryness, swelling, and hyperemia were reported. The same study reported a high incidence of caries compared to control areas. In addition, the authors noted an increased incidence of aphthous stomatitis and recurrent herpes in the exposed population. [2] The work of other researchers noted an increase in the incidence of periodontal diseases in the population of Belarus, especially in areas affected by the Chernobyl accident. [3] In the region of the Semipalatinsk nuclear test site, dental morbidity in children and adults was also studied. The most extensive comprehensive examination of the affected population of the Semipalatinsk region with the study of the course, treatment and prevention of periodontal and oral mucosa diseases is given, where it is convincingly shown that in the mechanism of development of oral mucosa candidiasis and chronic recurrent aphthous stomatitis, the leading role belongs to changes in immune parameters, salivary dysfunction and microcirculation disorders.

As risk factors, such as radiation dose, somatic diseases, dysfunction of salivation, and local immunodeficiency are listed. At the same time, over the years that have passed since the publication of this work, the doses of ionizing radiation that affected the exposed population have been clarified. Despite the fact that dosimetric studies in the territories adjacent to the SNTS were started back in 1953, that is, 52 years ago, there are still a lot of disagreements and contradictions in their assessment. From a historical point of view, two mutually opposite tendencies constantly existed in assessing the doses of ionizing radiation received by the population living in radiation-contaminated areas. One of these tendencies, put forward and defended mainly by employees of the military-industrial complex, was the desire to underestimate the amount of absorbed and effective equivalent doses received by the population as much as possible. A striking example of this is the adjustment of the dose to the city of Semipalatinsk for the entire existence of the nuclear test site, that is, from 1949 to 1989, in the amount of 0.03cSv. The opposite tendency was an attempt by some researchers to exaggerate the doses received by force, which in some publications turned out to be equal to or exceeding 400-500cSv. At present, it has been reliably established that the number of atmospheric explosions carried out between 1949 and 1989 was 166. There is some disagreement about the number of underground explosions, but at present most scientists are inclined to admit that there were about 500. [4] In recent years, considerable attention has been paid to the effect of ionizing radiation on the reproductive health of women and their offspring. In this regard, studies were carried out within the framework of two programs to assess the consequences of radiation exposure among children born to irradiated parents.

Single reports are devoted to the study of the dental status of people exposed to factors associated with the consequences of the explosions at the Semipalatinsk test site. When analyzing the literature data on the influence of the radiation factor on the state of the oral cavity, it should be borne in mind that numerous data indicate the role of odontogenic foci of infection on the development of a number of general somatic diseases of pathological conditions. On the other hand, diseases of the internal organs contribute to the development or aggravate the course of various pathological processes of the dentoalveolar system, the occurrence of which is preceded or accompanied by a violation of the homeostasis of the oral cavity. [5] When examining the state of the oral cavity and periodontal tissues in patients with diseases of the digestive tract exposed to ionizing radiation as a result of accidents at the Chernobyl nuclear power plant, it was found that congestive hyperemia and edema of the mucous membrane of the lips were

detected in atrophic and ulcerative gastritis of varying severity - in 60%, and cracks, erosion, dryness, peeling on the red border of the lips and in the corners of the mouth in 35%. Glandular cheilitis, resistant to the applied therapy, was noted in 10% of the examined patients.

In 73% of patients, catarrhal gingivitis was detected, hypertrophic - in 12%. In ulcerative lesions, 100% of the periodontal tissues were affected. In persons exposed to ionizing radiation, the pathological process involved the most radiosensitive areas of the oral mucosa - the lateral surface and tip of the tongue, the floor of the mouth, soft palate, cheeks, gingival margin and gingival papillae. [6] Moreover, the radiosensitivity increased in the case of insufficient hygiene - in the unsanded oral cavity, with the already existing caries. In children with an increased content of radioactive cesium and nitrates in the body, an increase in the activity of salivary amylase was found. It was noted that in the examined persons exposed to ionizing radiation, in almost all cases early symptoms of periodontal diseases were detected, and the periodontal index characterizing the severity of periodontitis or predisposition to it was higher than in people from "clean" areas. In patients with periodontitis, the manifestation of changes in local factors of nonspecific protection of the oral cavity depended on the degree of remoteness from the focus of nuclear damage. Dysfunctions of salivation, the local immune system, changes in the microelement-enzymatic composition of saliva and the cellular composition of the gingival fluid were the priority in the pathogenesis of periodontal diseases. One of the main criteria for the hygienic assessment of the radiation situation caused by global fallout is the data characterizing the strontium-90 content in human bone tissue. [7] It is known from the literature that patients with practically all forms of cancer in the head and neck area treated with radiation exposure develop radiation mucositis. Its cause is the selective death of the most rapidly multiplying cells of the oral epithelium. This condition significantly reduces the quality of life of the sick and is accompanied by pain and discomfort, reduces the available dose of radiation, negatively affecting its effectiveness. The pain can be so severe that narcotic analgesics are required to control it. The condition of patients is usually assessed by such clinical parameters as weight loss, difficulty in swallowing and speech.

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