ILLNESSES OF RADIOACTIVE RADIATION AND SIGNIFICANCE OF RADIOACTIVITY IN MEDICINE

Sharifov Ruslan
Students of the Faculty of Medicine of Samarkand State Medical University
Abdullayeva Laila
Students of the Faculty of Medicine of Samarkand State Medical University
Ergasheva Dilnura
Students of the Faculty of Medicine of Samarkand State Medical University

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Abstract. *Towards the end of the development of light diseases, the patient's condition worsens. They experience severe weakness, headache, loss of appetite, and the temperature rises. The stroke of the blood vessels accelerates, the arterial pressure decreases, the heartbeat is not felt well. All symptoms characteristic of light diseases appear: the production of blood elements decreases, a complete change in blood composition occurs. Lymphopenia and leukopenia increase, anemia develops. As a result of a decrease in the amount of platelets, blood coagulation is disturbed and thrombocytopenia occurs. ROE accelerates to 30-70 mm per hour, hemorrhages and bleeding are observed, oral ulcers appear, hair loss, diarrhea mixed with blood and mucus is observed.*

Key words: *platelet, leukocytes, thrombocytopenia, leukopenia, anemia, radiation, X-ray I-131, MSKT, PET radioactivity, thyroid gland, technetium-99 uranium-238.*

БОЛЕЗНИ ОТ РАДИОАКТИВНОГО ОБЛУЧЕНИЯ И ЗНАЧЕНИЕ РАДИОАКТИВНОСТИ В МЕДИЦИНЕ

Аннотация. *К концу развития легких заболеваний состояние больного ухудшается. У них наблюдается резкая слабость, головная боль, потеря аппетита, повышается температура. Ход сосудов ускоряется, артериальное давление снижается, сердцебиение плохо прощупывается. Появляются все симптомы, характерные для легких болезней: снижается продукция элементов крови, происходит полное изменение состава крови. Нарастают лимфопения и лейкопения, развивается анемия. В результате снижения количества тромбоцитов нарушается свертываемость крови и возникает тромбоцитопения. РОЭ ускоряется до 30-70 мм в час, наблюдаются кровоизлияния и кровотечения, появляются язвы в полости рта, наблюдается выпадение волос, диарея с примесью крови и слизи.*

Ключевые слова: *тромбоциты, лейкоциты, тромбоцитопения, лейкопения, анемия, облучение, рентген I-131, МСКТ, ПЭТ радиоактивность, щитовидная железа, технеций-99, уран-238.*

INTRODUCTION

The importance of radioactive elements in medicine is often very great in the diagnostic field, so they have been used since before. For example, in 1937, scientists at the University of California at Berkeley used a radioactive isotope to treat leukemia. One of the main achievements in the use of radioactivity in medicine was achieved in 1946 in the diagnosis of thyroid gland activity, treatment of thyroid cancer and hyperteriosis. Currently, radioactive substances are used to take images of the liver, spleen, thyroid gland, kidneys, brain, and also to detect heart diseases. PEM, CT, MRI Brachytherapy and other methods of radioactive elements

are used in diagnostics. During the development of nuclear chemistry, various experiments were conducted and put into practice. Radioactive elements are rare in nature, so experiments were conducted to create radioactive isotopes in laboratory conditions.

MATERIALS AND METHODS

Formation of radioactive isotopes. Today, most radioisotopes are formed from small amounts of non-radioactive isotopes. This process is called transmutation. In it, a stable nucleus is bombarded with highly active elementary particles (alpha particles, protons, neutrons, small nuclei). All elements with sequence number higher than 92 can be bombarded with elementary particles.

Most of them are obtained in very small quantities, live for a short time, and it is difficult to study their properties. Technetium-99m is used in radiation medicine during some diagnostic procedures, for example, in the detection of brain tumors, liver or kidney diseases. To obtain technetium-99, molybdenum-99 is released by first bombarding molybdenum-98 with neutrons in a nuclear reactor. then it is converted to the technetium isotope. The technetium-99m radioisotope, in turn, disintegrates, releasing gamma rays. Gamma rays are useful for diagnostic work, because they pass through the body to detection devices.

Exposure to radiation. We are exposed to radiation every day, even in small amounts, from the buildings we live and work in, the food and water we eat, and the air we breathe. For example, potassium-40 is present in any potassium-containing food. Other naturally occurring radioisotopes include carbon-14, radon-222, strontium-90 and iodine-131. In the United States, on average, a person is exposed to 360 mrem of radiation. Medical sources include dentistry, leg, spinal cord, chest x-rays, and mammograms. Space light around the Sun is another source of radiation.

People living at high altitudes and flying in airplanes are more exposed to radiation. The reason is that there are fewer light-absorbing molecules in the atmosphere. For example, people living in Denver receive twice as much radiation as people living in Los Angeles. Residents living near a nuclear power plant will not be exposed to much radiation, perhaps not more than 0.1 mred per year. At the same time, it was known that in 1986, as a result of the accident at the Chernobyl nuclear power plant in Ukraine, people in the neighboring city were exposed to the amount of radiation (1 Rem in 1 hour) as in radiation sickness.

Biological effects of radiation. Radiation collides with molecules on the way, and electrons are ejected from them and unstable ions are formed. If this ionizing radiation passes through the human body, it interacts with water molecules, displacing their electrons and forming H_2O^+ particles, which in turn causes unnecessary chemical processes to occur. The cells most sensitive to radiation are cells that divide very quickly, including spinal fluid, skin, genitals, intestines, and growing baby cells. Damaged cells do not produce the necessary substances. For example, if the cells of the spinal cord are damaged, the production of erythrocytes is disrupted. If sperm, ovary or fetal cells are damaged, birth defects appear in children. On the contrary, because the nerve, muscle, liver, and bone cells of adults are developed, they do not divide and are resistant to the effects of radiation.

Cancer cells divide rapidly. Since they are very sensitive to the effects of radiation, radiation rays are used to destroy them. Healthy cells surrounding cancer cells, on the other hand, divide more slowly and are less damaged by radiation. Nevertheless, radiation causes tumors, leukemia and genetic mutations.

Use of radioactivity in food preservation. Various bacteria and microbes get into food products and cause various diseases in humans. It also destroys the smoke of food products. But the use of radioactive radiation, like sterilization, kills bacteria. Bacteria die and stop dividing when exposed to light. From now on, long-term storage is ensured by exposure to light. In spaceships, in some hospitals, in nursing homes, meat is irradiated to prevent salmonella infection.

Light disease. Even a single exposure to a large dose of radiation has a great effect on the human body. Usually, it is not possible to detect radiation less than 25 bers. Irradiation of the whole body with 100 bers temporarily reduces the production of white blood cells. If the level of radiation is higher than 100 berds, the symptoms of radiation sickness are observed in a person: nausea, vomiting, weakness and a decrease in the number of white blood cells. If the radiation in the body exceeds 300 berds, the number of leukocytes may drop to zero. In this case, a person suffers from diarrhea, hair loss and infection. A radiation level of 500 ber can cause death in 50% of people exposed to this amount. This amount of radiation is called the lethal dose for half the population, or LD50. LD50 has different values in different living organisms. Irradiation of the body at levels of 600 ber and above can be fatal for all people within a few weeks.

Radiologists, employees of the nuclear industry, nuclear power plant, nuclear reactors, as well as those working with radioactive substances can suffer from radiation sickness due to non-observance of technical safety in peaceful conditions. The lethal effects of radiation are caused by the ionization of proteins, enzymes, and other substances in the body by alpha, beta, gamma rays, neutrons, X-rays, and cosmic rays.

DISCUSSION

As a result of ionization, the structure and activity of the cell nucleus is disturbed, as a result of which the cell dies. Under the influence of radiation, the following changes occur in the body:

1. During light disease, the formation of blood elements is characteristically disturbed. Blood vessels and blood-forming cells die, red marrow and lymph vessels disappear, and fat cells and connective tissue cells take their place. As a result, the number of lymphocytes and leukocytes in the patient's blood decreases, that is, lymphopenia and leukopenia develop, the number of erythrocytes and hemoglobin decreases (that is, the brain develops), the amount of platelets decreases (thrombopenia develops), and the protein content of the blood changes. the general condition of the patient worsens as a result of bleeding and blood disorder.

2. As a result of light diseases, blood coagulation is disturbed mainly as a result of a decrease in the amount of platelets, as well as the permeability and fragility of blood vessels increases. First, the gums bleed, and spot hemorrhages appear on the skin and internal organs (heart, stomach, intestines, liver, lungs, kidneys, etc.). in severe cases, there is bleeding from the nose and wounds, often there is bleeding, spitting blood, vomiting blood, urinating blood. Bleeding occurs in the joints, muscles, under the skin, and in the intestinal organs.

3. Ulcers appear on the lips, tongue, gums, gums, mucous membranes of the stomach and intestines, skin and many other organs in light diseases.

4. As a result of a decrease in the number of lymphocytes and leukocytes that protect the body from microbes, as well as a violation of immunity, the body's protective reaction against infections decreases sharply.

5. The process of tissue and cell regeneration is disturbed. Wounds, casts, and broken bones heal very slowly in light disease. Stomach and intestinal function is disturbed, bleeding and ecrotic ulcers appear from the mucous membranes, diarrhea mixed with blood and mucus, loss of appetite. After the radioactive substances enter the body, the airways and the mucous membrane of the stomach and intestines are strongly irradiated. Part of it leaves the body through feces, sputum and urine. Part of it is digested in the blood and remains in the bones, liver, thyroid gland, muscles, and radiation occurs in the body for a long time.

Complications of infectious diseases (inflammation of the lungs, sepsis, etc.) can lead to death in severe cases due to severe hemorrhages and hemorrhages, hemorrhages in the heart, brain, or blockage of intestinal channels and mixing of toxins. Favorable conditions and proper treatment After switching to the mode, the recovery phase begins. During the recovery period, the improvement of the patient's mood, decrease in temperature, opening of appetite, improvement of blood composition, cessation of bleeding, normalization of cardiovascular activity and diarrhea indicate the beginning of his recovery. Usually, the patient recovers after 23 months, but in case of severe damage, the full recovery of the patient takes up to 5-10 months. called complications and consequences.

CONCLUSION

17 out of 55 examinees (31%) have Ketle's index at the standard level, 27 examinees have obesity of the first degree (49%), and 27 of them have obesity of the first degree (20%). In particular, it is very important to establish a healthy lifestyle, to implement proper and rational nutrition, to promote sports and it widely among the population, to maintain constant physical activity.

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