

## COMPLEX ASSESSMENT OF THE HEALTH STATUS OF CHERNOBYL NPP LIQUIDATORS BASED ON THE METHODS OF RADIOLOGICAL DIAGNOSTICS

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As is known, Chernobyl NPP liquidators were exposed to a complex of unfavorable factors, such as low doses of ionizing radiation (external and internal radiation), psycho-emotional stress, physical and psychic tension, exposure to certain chemical compounds, changes in the regimen of work, rest and nutrition. Some of these factors (incorporation of radionuclides, psycho-emotional stress, harmful working conditions), as well as smoking, alcohol use, have their influence on the liquidators even after the completion of the works in Chernobyl NPP. The majority of the aforementioned influences can be attributed to the risk factors for the emergence and maintenance of pathological processes in the digestive organs [1-9].

38 Chernobyl NPP liquidators were examined, whose age ranged from 52 to 67. Methods of the examination: scintigraphy of skeletal system, thyroid gland, liver and kidneys.

All the studies were conducted according to clinical indications, taking into account the complaints of the patients, blood and urine tests, as well as other methods of radiological diagnostics; all patients underwent ultrasound scan, as a screening test.

Radioisotope investigations were conducted based on program packages of IAEA, according to

international protocols and adopted algorithms of choice of the "first line" method. Radioactive Tc-99m was used, with respective kits (Pyrfotech, DTPA, kolloid). In case of thyroid gland examination, radioactive Tc-99m was used without a kit. All studies were conducted on a "SPECT" – camera. The main goal is to early reveal the impaired function and the development of these impairments in dynamics, which creates conditions and justification for a choice of medical treatment in each specific case.

It is necessary to mention that, to date, there is no alternative for the radioisotope methods used in this work; the absence of alternatives is seen in the following stages: in the examination of the kidneys – the filtration phase, in the examination of the liver – the condition of the reticuloendothelial system ("Kupffer cells"), in the examination of the thyroid gland – the identification of "hot" and "cold" foci and/or developmental anomalies, in the examination of the skeletal system – the visualization of the bone marrow and the differentiation of bone pathology.

Based on the obtained data, it can be stated that the degree of the functional disturbance, revealed by the methods of radioisotope diagnostics, does not always correspond to the data of other clinico-

radiological changes, when assessing the degree of the functional disturbances of an organ or a system. This well-known fact is explained by methodological features of other methods (ultrasound, biochemical and other blood and urine tests); anatomical changes and shifts in biochemical and general analyses appear much later than the functional disturbances (6 months and more).

Methodologically, radioisotope investigations have a strictly targeted direction, as was mentioned above.

Reasoning from all the aforementioned, during the examination of Chernobyl NPP liquidators, the function of liver and spleen was measured (in case of viral and non-viral hepatitis), in the examination of the kidneys — the linear rate of secretion and the volume rate of filtration, the focality of the thyroid gland. With a complex combination of all radiation and non-radiation methods, the following patterns were revealed:

1. In case of disorders of the thyroid function, in 56–60% of patients renal pathology (predominantly — pyelites of different etiology) was revealed.
2. Enlargement and/or disturbance of the liver function had a certain directionality in relation to the involved segments and enlargement of the spleen with its activity. The latter depended on the etiopathogenesis of the disturbance of the reticuloendothelial system's function (viral or non-viral involvement, as well as hepatitis "B" and "C").
3. All examined liquidators had various pathologies of the musculoskeletal system, most often accompanied by thyroid pathology, by type of diffuse disorders of non-oncological genesis.
4. groups were analyzed:

Group I — hepatitis without focal and fatty changes. Characteristic features: increased contrast of the "cardial" section and a change in the 6th segment to 20–22%, enlargement of the 6th segment, without changes in the spleen.

Group II — hepatitis in combination with fibrosis and focal changes.

Characteristic features: enlargement of the right lobe of the liver, predominantly 6th, 7<sup>th</sup> and 8<sup>th</sup> segments. Minor enlargement of the left lobe of the liver, enlargement of the spleen (20–21%) and an increase in the contrast (20–25%); the ratio of the contrast of the liver and the spleen is 75/25%.

Group III — severe hepatitis with fibrotic changes.

Characteristic features: enlargement of the 2 lobes of the liver (all segments, 60–65% decrease in the contrast, foci without a clear outline, enlarged (up to 50–55%) spleen, high contrast (60–65%)). The ratio

of the contrast of the liver and the spleen is 40/60%.

Group IV — hepatic cirrhosis.

Characteristic features: small liver, minimal contrast — 30–35%. The spleen is increased in size, the activity is 80–81%. Besides the liver and the spleen, presence of radiopharmaceuticals is observed also in the vertebrae, bone marrow segments and is an absolute sign of cirrhotic changes of the liver, which is necessarily combined with a reduction in the liver size, with an increase in the spleen size and presence of a large number of fibrotic foci.

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