

## ACTUAL NUCLEAR MEDICINE PROBLEMS IN PEDIATRICS

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The current state and prospects for the development of nuclear medicine in pediatrics was analyzed on the basis of literature data and own experience. The main directions of radionuclide diagnostics and radionuclide therapy in children were considered briefly. There is a quantitative predominance of radionuclide diagnostic studies in pediatric urology compared to studies in oncology. Radionuclide therapy in children are used much less often and mostly for the hyperthyroidism, differentiated thyroid cancer and neuroendocrine tumors.

Currently the most important problem is the exact determination of the individual optimal activity of the radiopharmaceutical administered to a child. The technology is based on body weight and the protocol on a specific device. In the first approximation, this problem is solved by the reference diagnostic levels of activity. At the same time, the impossibility of obtaining an exhaustive solution to the problem of individualization on the basis of the current domestic regulatory documentation was stated, although methods for the refined calculation of the specified activity for the most commonly used diagnostic radiopharmaceuticals in pediatrics have already been proposed and validated by international specialized organizations. In radionuclide therapy for children, optimal activity is determined by the theranostics principles and technologies.

The widespread introduction into clinical practice of hybrid devices for radionuclide research leads to radiation exposure increase to pediatric patients, when internal radiopharmaceutical dose is supplemented by a higher dose of external radiation from X-ray CT. Methods for determining organ and effective doses of diagnostic exposure of children are analyzed. It is noted that the errors in the indicated radiation doses determining on the basis of domestic regulatory documentation and international recommendations reach several tens of percent, what is significantly worse than the other radiation therapy methods accuracy.

When compiling the list of clinical indications for nuclear medical procedures in children, there is the need of taking into account the risk of radiation-induced carcinogenesis. In the case of radionuclide therapy its probability in children is significantly higher. The possibility and expediency of risk assessment based on the concept of effective radiation risk instead of the concept of effective dose is discussed. It also requires the development of appropriate methodological recommendations, including the international level.

The technological and psychological features of nuclear medical procedures in children are discussed together with a higher complexity of their implementation. Practical recommendations for such cases are presented.

### The speaker is a student or young scientist

No

### Section

1. Nuclear technology and methods in medicine, radioecology

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