

Many of the issues associated with cancer diagnosis and its subsequent treatment nowadays are in the process of being revised in connection with introduction of modern technologies in all areas of medicine, with the widespread use and availability of computer technology and the Internet. The actual processes of creating and improving radiotherapy equipment databases devoted to a region or a country or for the whole world are becoming more realistic using the capabilities of the personal computer with the accumulation and analysis of information.

Currently in Belarus there are 14 cancer institutions, national with regional and district subordination, where the irradiation with the use of medical linear electron accelerators, gamma-therapeutic and x-ray installations is provided to cancer patients.

In Alexandrov NCCB since the exit of the Republic of Belarus from the Soviet Union a radiotherapy equipment registration had been carried out. In particular, the specialists of Alexandrov NCCB have a list of devices for the medical exposure of the Republic of Belarus with their main technical and dosimetric parameters, calibrations dates and operating conditions for all oncological institutions of the country. It allowed medical professionals that are providing control over the provision of medical help to Oncology patients to track the latest information on this issue. It should be noted that, unfortunately, the database of devices for radiation therapy was not available for public use. In 1995, the IAEA had developed an online, accessible to any Internet user register of cancer centers and clinics that use radioactive isotopes and high-energy radiotherapy machines. The Alexandrov NCCB staff has created, and continuously kept up to date particular similar database for oncological medical institutions of the Republic of Belarus, which is included in the register of the IAEA.

This online register is continuously updated based on data from leading institutions experts and includes data not only on radiotherapy facilities, but also the sources of ionizing radiation and equipment for brachytherapy. The advantages of this database are: availability for the every interested person, ability to obtain the right information anywhere about any institution and the ability to communicate with physicians-radiation oncologists and medical physicists from oncological clinics. All data are correct, up to date and are provided directly by staff of each institution. New accounting system of the radiation therapy apparatus allows us to improve and/or replace obsolete equipment thus using the state money more efficient way.

COMPARATIVE ANALYSIS OF THE STATUS OF RADIATION THERAPY IN THE REPUBLIC OF BELARUS AND THE COUNTRIES OF THE FORMER USSR

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Today it is possible to conduct a comparative analysis of the status of radiation therapy in the Republic of Belarus and the countries of the former Soviet Union. The former USSR countries became competitors, both in quality of healthcare service and number of radiotherapy units. There were and are many disputes over the taking the leading role in the field of oncology in the post-Soviet territory.

Keywords: radiation therapy, comparative analysis, diagnostics, oncology dispensaries, radiotherapy equipment.

A radiation therapy is growing rapidly on the territory of the former USSR. The main reason for this situation is the accident at the Chernobyl nuclear power station, which led to a sharp increase in cases of cancerogenesis among the population of the Republic of Belarus. After the collapse of the Soviet Union, the overall Healthcare system had been divided into small parts. The former USSR countries became competitors, both in quality of healthcare service and number of radiotherapy units.

Today it is possible to conduct a comparative analysis of the status of radiation therapy in the Republic of Belarus and the countries of the former Soviet Union. Leading position in the number of cancer institutions is confident the Russian Federation and their number is 165. The Republic of Belarus has 14 oncology centers and clinics. The physicians that are working there provide diagnosis and treatment using gamma radiotherapy systems, medical electron accelerators, and x-ray machines, brachytherapy with radioactive sources (Ir-192). On the territory of Ukraine there are 58 institutions, providing diagnosis and treatment of cancer. Additionally, the Kazakhstan and its 22 cancer institutions are interesting for us, but only 20 are operational nowadays. Uzbekistan has 12 clinics with radiotherapy equipment which in recent years have been upgraded to the modern state.

The largest institutions are "N. Blokhin Cancer Center " (Moscow, 1951), "N. N. Alexandrov National Cancer Center of Belarus" (Minsk, 1960), clinic "LISOD" (Kiev). These centers had implemented the newest radiotherapy equipment from leading manufacturers (Varian; Skoda UJP; Nucletron; Elekta), technologies and devices in the medical-research process that allows quickly establishing the diagnosis in the most difficult cancer cases, and provide the highest-quality treatment.

DEVELOPMENT OF DATA DEPENDENT MS/MS ANALYSIS USING HIGH-RESOLUTION CHROMATOGRAPHY-MASS SPECTROMETRY

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In modern scientific disciplines of natural science, mass spectrometry plays an increasingly important role as an analytical method, and therefore the development of methods for determining compounds of different nature, as well as approaches to the development of these methods using compatible software. When writing the work, a chromatography-mass spectrometric analysis method was used to develop "data-dependent MS / MS analysis". Samples with different biological matrices containing anabolic steroids as the test compound were analyzed

Keywords: chromatography-mass spectrometry, data-dependent MS/MS analysis, high resolution mass spectrometry, steroids.

Anabolic steroids play an important role in the lives of modern people, regardless of origin. An important component in the approach of determining these compounds is the choice of an analytical system based on the characteristic properties of molecules, which make it possible to definitely pinpoint a given compound among the enormous number of connections of the matrix in which it is located. As a result, a promising method is a hybrid analytical method – chromatography-mass spectrometry.

In this study, the development of "data-dependent MS/MS analysis" of samples containing anabolic steroids was carried out. During the development, samples containing urine, which had been tested by dilute-and-shoot method, were analyzed. The development of the analysis, as well as data processing, was carried out with the help of Xcalibur software by Thermo Scientific. Samples containing human urine, as well as the culture medium, were used as blank samples. When processing the obtained data as a result of the analysis of blank samples, matrix ions were added to the list of exceptions to increase the signal-to-noise ratio when scanning with the mass-detector ions contained in the sample being analyzed.

After the analysis of the analytically significant compounds, the optimum width of the permissible m/z value of the ion included in the list of MC/MS-decay exclusions was established, as well as in the list of the temporary exclusion of the MS/MS decay. As a result of the analysis, a regularity was established. When setting a value other than the minimum, erroneous recording of analytically significant ions in these lists was observed, as a result of which they were not detected and were not subjected to MS/MS decay. During the processing of the obtained data, a minimum threshold for detecting ions with subsequent MS/MS decay was established, which in turn increased the efficiency of the analysis, in connection with the absence of additional scanning of low-intensity ions. As a result of the development of this analysis, were achieved optimal parameters for detecting and fragmenting compounds contained in small quantities in biological media, which facilitates its use in screening assays in which the mass spectrometric method is combined with HPLC. Using this type of analysis with additional databases on fragment ionic compounds, it makes it indispensable in the study of metabolomics, proteomics and other related areas.

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