

The attempts to harmonise nuclear medicine in Ukraine

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Introduction

During the years 1991–1997 the number of nuclear medicine (NM) laboratories and radionuclide investigations in Ukraine decreased significantly. The number of radioimmunoassays decreased by 2.2 times, functional radionuclide investigations fell by 4.6 times, scans and scintigraphies fell approximately by 10 times. The number of NM laboratories decreased from 81 in 1991 to 65 in 1998. Mainly this is related to difficulties with obtaining radiopharmaceuticals. Unfortunately, due to the economic difficulties in this country, the Ukrainian Ministry of Public Health does not have sufficient funds to cover the expenses of radiopharmaceuticals. Today, in accordance with official decisions, the Ministry of Public Health provides funds for radiopharmaceuticals for only 7 institutions. Other NM laboratories must find funds on their own using local budgets. Unfortunately, most of them are unsuccessful in their efforts. Moreover the limited funds for centrally-financed radiopharmaceuticals (i.e. through the Ministry of Public Health) cannot satisfy the needs of all users.

The main goals

In order to improve the situation we have tried to establish the following goals:

- 1) to create a National Society of NM;
- 2) to create the facilities for manufacturing gamma cameras and for providing quality control of gamma cameras;
- 3) to improve the situation in the supply of radiopharmaceuticals and to study the issue of their domestic manufacture;
- 4) to implement cost-effective approaches and standardisation of NM methods;
- 5) to prolong the duration and quality of postgraduate education;
- 6) to stimulate the interest of the medical community and the authorities in NM in this country.

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Results

Ukrainian Society of NM (USNM). USNM was created on June 24, 1998. During 1998–1999 information was collected about the status of NM in 27 administrative regions of Ukraine. We established direct ties with specialists «on-site», unified our needs and started work towards improvement of the situation. We started to enlighten the medical community on NM issues (serial reports on TV and different meetings). In particular, we took part in special meetings: «Radiology of the head and neck» (Odessa, 1998), «Bone-soft tissues radiology. The physics of medical imaging» (Kharkov, 1999), «Issues of malignant lymphomas — diagnosis and treatment» (Chernigov, 1999), «1st Ukrainian Congress of irradiation therapy» (Kharkov, 1999), «Nuclear technologies in medicine» (Kiev, 1999).

We tried to involve specialists from other kinds of science in the field of our activity. To-day many physicists from Kiev, Kharkov and Uzgorod are members of our Society. This is very important for the creation of real facilities for upgrading Ukrainian gamma cameras and for studying the possible production of domestic radiopharmaceuticals. These issues were discussed during the 1st Ukrainian Congress on NM in Kiev (13–16 September, 1999). It is worthy of note that this Congress was the first meeting dedicated to the «clear» problems of NM (NM in oncology, cardiology, neurology, urology, hepatology etc.) in this country. In the future we are going to organise Ukrainian Congresses on NM on a regular basis in conjunction with the Ministry of Public Health and physicists. During our Congress we also discussed the issues of health protection of individuals against the dangers of ionising radiation in relation to medical exposure. This was especially important for us because «The National Rules of Radiosafety» need considerable correction.

We established ties with EANM and IAEA. The support obtained from them contributed to the effectiveness of our activity. In particular, the Regional Training Course on Preventive Maintenance and Quality Control of Gamma-Camera Computer Systems under the aegis of IAEA helped Ukrainian engineers to make decisions about some important technical issues of upgrading and quality control of gamma-cameras.

Some Ukrainian laboratories of NM also received from IAEA Portable Imaging Processing (PIP) for planar gamma-cameras.

We have established a formal partnership between USNM and the Ukrainian Association of Radiology (UAR) on the basis of mutual agreement. The main aims of this agreement are the scientific and clinical promotion of medical radiology including NM,

development of patient examination algorithms and organisation of common meetings. Following this agreement the representative of USNM (the President) has been included on the board of UAR and must represent the interests of USNM. Previously UAR was unable to really contribute to the development of NM in Ukraine (it mainly satisfies the needs of ultrasonography, roentgenology, MRI). Now we have a real chance to improve the situation in NM using both our Society and UAR.

We stimulated the interest of the authorities (Ministry of Public Health) in NM in this country and they assisted us in making decisions about some of our problems. In particular, they helped us to organise the 1st Ukrainian Congress on NM.

Equipment. During the last year the amount of equipment increased by 7 domestic and 2 foreign gamma-cameras for SPECT. To-day we have 40 functional gamma-cameras (among them 15 gamma-cameras for SPECT). We have started activities towards quality control of gamma-cameras and standardisation of programs for radionuclide diagnosis according to the standards of IAEA and using IAEA support. One of the main goals of these activities is the introduction of quality control measures on a regular basis.

Radiopharmaceuticals. As a result of our activities in 1998–1999 some stabilisation in the supply of radiopharmaceuticals was achieved. An increase was also recorded in radioiodine supplies. To a certain degree this is associated with a marked increase in thyroid cancer in Ukraine. Some NM laboratories began to use ⁸⁹Sr-chloride for bone metastases treatment. At the same time the general level of radiopharmaceutical supplies still remains on the low side and potentially could be increased by a few times. The main barrier to this is the high price of foreign radiopharmaceuticals. After contacts with representatives of foreign firms the price of radiopharmaceuticals was decreased somewhat but this is still not sufficient.

Domestic production of radiopharmaceuticals could be the ideal solution to this problem (low price and government support) and we discussed this issue together with physicists and the authorities. The decision about domestic radiopharmaceutical manufacturing depends on multiple factors and one of the main ones among them is the quality of radiopharmaceuticals. This is associated with the creation of a national laboratory to conduct the quality control of radiopharmaceuticals. The latter is needed already to-day in order to create a barrier to prevent the influx of low-quality radiopharmaceuticals into our country. Already to-day we have low-quality scintigraphic images using radiopharmaceuticals labelled with ^{99m}Tc obtained from Uzbekistan but we cannot evaluate the features of these radiopharmaceuticals on the basis of control tests. Unfortunately, we also have no technique for simple testing of the radiopharmaceuticals in the laboratory during everyday practice.

We are not sure whether the attempts of our physicists to create domestic radiopharmaceuticals of high quality will be successful and therefore we are developing relationships with foreign firms which can supply high quality radiopharmaceuticals. Even to-day despite the economic difficulties our colleagues more often use expensive but high quality radiopharmaceuticals than inexpensive and low quality ones.

In our specific economic conditions we are trying to implement cost-effective approaches, including the use of so-called multipurpose scintigraphy. The volume of diagnostic information obtained with methods of multipurpose scintigraphy during single investigation is comparable to that using a few routine methods of radionuclide investigation or other modalities. In particular, the use of multipurpose scintigraphy with osteotropic ^{99m}Tc-pyrophosphate (single investigation) enables the revealing of renal function changes, evaluation of anatomotopographic status of the kidney, visualisation of primary retroperitoneal tumour in children, tumour lesions in bones, formation of respective scintigraphic patterns which effectively contribute to the differentiation of Wilm's tumour, neuroblastoma (including neuroblastoma involving the kidney, main vessels and surrounding tissues), malignant lymphomas, abnormalities of kidney development and their combinations with tumours. Multipurpose lymphotropic scintigraphies with ⁶⁷Ga-citrate and ^{99m}Tc-pyrophosphate were also developed and used.

The use of new algorithms of patient examination on the basis of multipurpose scintigraphies and radioimmunoassay leads to a decrease in volume, time, costs of study, burden irradiation.

We started activities towards the standardisation of methods for radionuclide diagnosis and treatment according to the recommendations of EANM and IAEA. In particular, the recommendations of EANM (Task Group on Irradiation Therapy) helped us in the unification of thyroid cancer treatment in Ukraine.

Education. Previously the duration of education was very limited. Now the education of NM specialists includes residency (1 year after completion of the medical institute including variable duration of NM practice «on-site»), postgraduate education (medical radiology including 3 months of NM education), attestation cycles 1 month before examination (once every 5 years), periodic cycles of NM specialisation (3 months) or topic courses of education upgrading (1 month) at the Kiev Academy of Postgraduate Education.

Of course, the duration of education is not sufficient but the situation in this field has somewhat improved.

Conclusion

We consider that the continuation of the above activities and implementation of the advanced methods of radionuclide diagnosis and treatment will enable the survival and development of NM in Ukraine.