

International Day of Radiology 2014
Interview on brain imaging
Belarus / Dr. Ruslan Sakovich



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Dr. Ruslan Sakovich, assistant professor at the department of radiology, City Clinic Hospital No. 2, Minsk, Belarus, and chair of radiology at the Belarussian Medical Academy of Postgraduate Education, spoke to the ESR about how Belarusian radiologists communicate with patients and how brain imaging is practised.

European Society of Radiology: Imaging is known for its ability to detect and diagnose diseases. What kind of brain diseases can imaging help to detect and diagnose?

Ruslan Sakovich: Brain imaging MR and CT techniques allow doctors and researchers to non-invasively view activity or problems within the human brain. There are a number of accepted, safe MRI techniques in use today in hospitals and by research groups in Belarus. Brain imaging helps to diagnose such diseases as congenital malformations, CNS trauma, subarachnoid haemorrhage, aneurysms, cerebral ischaemia and infarction, vascular malformations, neoplasms, infectious, demyelinating diseases, metabolic/degenerative disorders, and other conditions. Using 1.5 and 3 Tesla MR units in our country, morphological and functional magnetic resonance imaging (fMRI) is possible for measuring brain injuries.

ESR: How useful is imaging in brain disease management? Does it improve the understanding of disease or improve patient prognosis?

RS: Brain diseases may come in different forms. Infections, trauma, stroke, seizures, and tumours are some of the major categories of brain diseases. So neuroimaging helps to choose the right and most correct way of treatment, therapeutic or surgical, and it also determines a list of specialists such as neurologist, oncologist, neurosurgeon, and interventional surgeon to be involved into a treatment process. To select the appropriate therapy, the physician must have all the relevant information about the patient, including age and performance status, as well as the number, size, and location of the brain tumours, vascular malformation and other pathological conditions. Multimodality approaches to diagnosis such as the combination of CT, MRI, angiography, SPECT have shown superior results in terms of survival time, neurocognitive function, cost of treatment and, of course, quality of life.

ESR: What kind of technology and techniques do radiologists use to image the brain? Are there any specific techniques for particular diseases?

RS: MRI is the gold standard for brain imaging. There are some specific techniques for particular diseases such as SWI, for detecting the products of haemoglobin breakdown; DWI, for cytotoxic oedema imaging; perfusion, for imaging the passage of a fluid through the brain; ASL, for providing an endogenous and completely non-invasive tracer for the quantification of regional cerebral blood flow with magnetic resonance imaging; DTI, a 3D-modelling technique used to visually represent neural tracts using data collected by diffusion tensor imaging; and fMRI, a non-invasive test that uses a strong magnetic field and radio waves to create detailed images of the functional brain regions.

ESR: What is the difference between a radiologist and a radiographer? Who else is involved in performing brain imaging exams?

RS: The differences between a radiologist and a radiographer in Belarus are the duties performed by each of them and their measure of responsibility. The radiologist plans the exam and interprets its results. The radiographer performs the technical part of an examination. The cooperation between them is key to the success and effectiveness of neuroimaging.

ESR: How many patients undergo brain imaging exams in your country each year?

RS: Last year, 257,360 patients underwent MRI exams in Belarus: 68,001 were brain imaging, 76,927 spine imaging and 112,432 were other body regions. We have had an average growth of 10–20% per year in the number of MR exams due to the installation of new MR units and optimisation of the ones already installed.

ESR: Access to modern imaging equipment is important for brain imaging. Are hospitals in your country equipped to provide the necessary exams?

RS: There are about 20 magnetic resonance scanners in Minsk (population of two million). Most of them are 1.5 Tesla. There is one 3 Tesla scanner in the Republican Scientific Practical Center of Neurology and Neurosurgery – GE Discovery 750W. There are MR units from world-famous producers: Siemens, Philips and GE. We don't have any MRI machines from Toshiba and Hitachi yet. Every year, 1–2 new MRI scanners are introduced in our city.

ESR: In many countries there are waiting lists for MRI exams. How long can patients typically expect to wait for an exam in Belarus?

RS: Emergency patients are accepted without delay, other hospitalised patients wait 2–3 days. These exams are free. The waiting list for MRI exams for private patients is approximately a month and a half. All MR units in Minsk operate seven days a week from 8 a.m. till 8 p.m. except holidays.

ESR: As the global population gets older, the risk of developing neurocognitive and neurodegenerative disorders increases. How can imaging help tackle this issue?

RS: New techniques help the radiologist to diagnose neurodegenerative diseases, metabolic disorders, Alzheimer's disease for example, by using a combination of different modalities and, such methods of visualisation as MR tractography, which shows neural tracts of white matter of the brain.

ESR: Some imaging techniques, like x-ray and CT, use ionising radiation. What risk does this radiation pose to the patient and what kind of safety measures are in place to protect the patient?

RS: Using alternative modalities, for example, neurosonography and MRI, low-dose protocols for CT scanning, modern CT scanners, iterative reconstruction algorithm, clear selection of patients for examination, restriction of scan areas, as well as using x-ray protection clothing will help to protect the patient from ionising radiation. But I think when the patients have clear indications for CT exams and don't have contraindications, we can use CT scanning or change it to MRI for early diagnosis and the selection of correct treatment.

ESR: What kind of role can imaging play in preventing and predicting brain diseases?

RS: Brain imaging gives us an opportunity to reveal the disorders at an early stage, which is especially important in the choice of method of treatment and the further prognosis. By using MRI now, we may have an easier way to spot the degenerative brain disease long before symptoms appear. For example, patients with developing symptoms of memory loss and cognitive deficits are more likely to show shrinkage in certain areas of the brain at an early stage, compared with those who don't develop Alzheimer's. These changes can be seen in MRI scans of the brain.

ESR: In general, patients don't see the radiologist. A patient will discuss the image with the neurologist, neurosurgeon or oncologist. When they ask a question, they're often told "I'm not a radiologist". Why don't radiologists discuss the image with the patient first?

RS: We have already solved this problem. There is an opposite approach to the relationship between the patient and the radiologist in our country. The radiologist and clinicians work closely with each other, and as a rule the radiologist is the first doctor to communicate with the patient after scanning. The radiologist discusses the results with the patient and gives him/her initial recommendations. We consider it very important for radiologists to talk and cooperate with patients in order to achieve the best outcome. Belarusian radiology training promotes this approach to young radiologists from the first year of education.

ESR: How expensive are radiological examinations to the health service and is there a risk that some of these examinations could be blocked by health technology assessment agencies deeming them to be not cost-effective? If so, how can patients help to ensure that these examinations are made available?

RS: MRI examinations cost the equivalent of \$40 to \$100 in Belarus. There is a low level of development of medical insurance in our country. But at the same time, according to the Constitution of the Republic of Belarus, every person can get free medical help if there are indications and appropriate evidence. The radiologist determines the modality, range of examination and scanning technologies, including the use of contrast agents. Additional examinations are performed at the patient's request in return for payment.



***Ruslan Sakovich** is head of the radiology department at Minsk City Clinical Hospital No.2 and chief radiology specialist on the Minsk State Healthcare Committee in Belarus. He also works as a teacher at the Belarusian Medical Academy of Postgraduate Education. He was previously head of the radiology department at Minsk State Mental Hospital, where he took an active part in a programme of neurovisualisation and stereotaxic treatment of epilepsy, focusing in particular on low-field MRI in the diagnosis of epilepsy. His fields of interest are neuroimaging, cardiovisualisation, and abdominal and musculoskeletal imaging using MRI and CT. Dr. Sakovich has published about 40 articles in different journals, and taken part in conferences, workshops and science programmes all over Europe. He is a member of the Belarusian and European societies of radiology, as well as the Russian Society of Neuroradiology.*