

International Day of Radiology 2014
Interview on brain imaging
Lithuania / Dr. Jurate Dementavičienė



**INTERNATIONAL
DAY OF
RADIOLOGY**
AN INITIATIVE OF THE ESR, ACR AND RSNA

The ESR got together with Jurate Dementavičienė, associate professor and head of the department of radiology, nuclear medicine and medical physics at Vilnius University Hospital Santariskiu Klinikos in Lithuania, about the safety measures taken in brain imaging and the importance of imaging in diagnosing neurological conditions.

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?

Jurate Dementavičienė: There is a wide range of brain diseases that imaging can help to diagnose or provide additional information for disease management. It is not possible to present a list of them, because there are various situations according to individual findings and the clinical data of each patient. Usually, the neurologist or neurosurgeon makes the clinical examination and decides the need for imaging. Imaging is valuable in cases where the disease changes the structure and material of the brain parenchyma, which could be visualised, for example haemorrhage, ischaemia, tumour, etc. Imaging is crucial in emergency cases, such as stroke and trauma, when fast diagnostic information is necessary for treatment and recovery. It is important to decide which technique would be most helpful in each case, and the clinician and the radiologist make this decision together. All emergency cases are primarily examined by computed tomography (CT), because it is fast and provides all the necessary information about acute diseases. In other cases, it depends on clinical findings and suspected pathology. For example, when multiple sclerosis, epilepsy, congenital malformations are suspected, magnetic resonance imaging (MRI) is the modality of choice. The examination has clinical value not only when signs of disease are found, but also negative results are important to rule out some diseases, when few of them have similar symptoms. Some diseases cause very tiny changes at the molecular level that cannot be seen on images. Fortunately, imaging techniques are developing and new achievements provide us with more diagnostic tools.

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

JD: Imaging is very important in brain disease management. The invention of CT and MRI revolutionised patient management in neurology and neurosurgery. Imaging improves the understanding of disease, which is important in its management. It also improves the patient's prognosis by providing diagnosis, influencing the choice of treatment, providing follow-up, preventing complications, etc. New and more promising treatment possibilities require better imaging and thus taken together improve patient prognosis and 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?

JD: The most widely used modalities nowadays are CT and MRI, which may be used with many different and specific techniques and protocols. Each of them has advantages in particular situations or diseases. As mentioned before, CT is generally used in emergency cases and many other clinical situations. MRI is the gold standard for the evaluation of brain parenchyma changes in cases such as demyelination, tumours, congenital malformations, etc. Ultrasound is a very important modality in diagnosing brain disease in neonates, whose vault bone sutures are not calcified and closed. US is widely used in diagnosis vessel changes in the neck in the arteries that feed the brain, and transcranial examination can provide information about intracranial blood flow in the main arteries.

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

JD: The radiographer and the radiologist are both in charge of the quality of the performance and the results of the examination. The radiographer performs the procedure, starting from patient identification through scanning and finalising it, checking the quality of images. The radiologist is a medical doctor who is responsible for the choice of the technique, protocol applied to the patient, post-processing of the images, analysis and reconstructions, reporting on findings and making the final radiological conclusion. In the exam, a nurse may sometimes be involved to help in positioning the patient, injecting the vein for contrast material, and caring for the patient.

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

JD: We don't have exact numbers, since there are many centres in the state; regional hospitals as well as in private centres. Statistical information is only collected on radiation procedures and general numbers. My personal impression is that there are a lot of brain imaging examinations and the numbers are increasing each year.

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

JD: Many hospitals are equipped with new equipment or have agreements with private centres. The problem is in the ageing of the machines and replacing them.

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

JD: There are waiting lists in Lithuania as well. The length depends on the situation. All severe cases are scanned within a few days up to a week; there are only a few emergency diagnoses for MRI. Most inpatients are examined during their stay at the hospital, except when there is no clinical need for speed or follow-up later. Doctors also differentiate patients depending on the clinical situation. For chronic cases, waiting lists can vary from two weeks to three months, depending on the city and the centre. Usually, they are longer at university hospitals than in private centres.

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

JD: In most cases, neurocognitive and neurodegenerative disorders are diagnosed by clinical neurological symptoms. Imaging findings occur usually in the late stage of the disease and are not specific. Recent investigations and developments are in progress in this field. However, imaging very often helps to exclude other diseases that could present with similar symptoms and for which treatment would be very different.

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?

JD: Ionising radiation for medical diagnostic purposes is used with increasing frequency. We are working under the guidelines of radiation protection institutions, and we are under continuous control of and in close contact with responsible people and officials. The doses from medical devices are quite low and don't cause any damage to the patients. Nevertheless, we have to control this process. Our duty is to follow the as low as reasonably achievable (ALARA) principle. We are especially careful when we are imaging young patients and pregnant women. In such cases, ionising exposure is applied only when there are no other possibilities and when the advantages of the examination exceed the possible risks.

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

JD: There is no means to predict brain diseases, but we can examine some people at risk to prevent complications, such as people with known family cases of intracranial artery aneurysms, which could be inherited. But there is no preventive screening for brain diseases. Imaging plays an important role

in diagnosing, preparing for treatment, follow-up, predicting complications and assessing recovery results.

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?

JD: In some cases they do, but it is not a rule. In my opinion it is due to several factors: analysis of the images takes time and usually the report is performed in a few hours or days, so the patient doesn't wait for it nor comes back to the radiologist. Sometimes the radiologist works in a remote location from the scanning room. The radiological conclusion does not always correspond to the final diagnosis, sometimes it provides much more information or less than expected, and the radiologist is not aware of the clinical situation, so his/her consultation could cause confusion to the patient. The clinician gets a lot of information from different exams and tests, so he/she can provide the best final consultation to the patient. Nevertheless, I am sure that in many cases the radiologist should discuss with the patient, or the patient should have an opportunity to talk to the radiologist. It should become more usual and accepted.

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 (especially in relation to screening)? If so, how can patients help to ensure that these examinations are made available?

JD: There are no health technology assessment agencies in Lithuania. The healthcare ministry takes all the responsibility and makes all the decisions. As we know, radiological examinations are very expensive and not paid by social insurance accordingly, so there are some restrictions. Private companies fill the gap; there are many CT and MRI units at private medical centres. Some of them perform examinations just for social insurance, some take extra payment or private insurance. The activities of the groups and open discussions can help to improve the situation. At present, the healthcare ministry is working on reducing waiting lists for CT and MRI examinations.



Jurate Dementavičienė is associate professor and head of the department of radiology, nuclear medicine and medicine physics at Vilnius University Hospital Santariskiu Klinikos in Lithuania. She specialises in conventional radiology, CT and MRI, with a particular focus on neuroradiology and imaging in cerebrovascular disease. She is also chief of radiology residents at Vilnius University's Faculty of Medicine. She trained at Vilnius University, Kaunas Medicine University, St. Petersburg Institute for Advanced Training for Physicians in Russia, Albany Medical Centre in the United States, Cambridge University, UK, and institutes in Germany, Austria and Poland. Dr. Dementavičienė has been President of the Lithuanian Radiologists' Association since 2006. She is a member of the European Society of Radiology, European Society of Neuroradiology, International Society of Magnetic Resonance in Medicine, and Radiological Society of North America.