

**International Day of Radiology 2014**  
**Interview on brain imaging**  
**Guatemala / Dr. José Carlos Echeverría Solís**



**INTERNATIONAL  
DAY OF  
RADIOLOGY**  
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The ESR spoke to Dr. José Carlos Echeverría Solís, medical director of the Diagnostic Imaging Centre, chief of the radiology department at the National Western Hospital in Quetzaltenango and director of the National School of Radiology in Guatemala, about the range of diseases brain imaging can help detect.

**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?**

**José Carlos Echeverría Solís:** Imaging can detect a number of diseases and processes such as congenital, traumatic, neoplastic, metastatic, vascular, degenerative, metabolic, toxic, infectious, and demyelinating diseases.

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

**JCES:** Imaging is extremely useful for decision-making in neurological diseases. Imagine medicine without imaging: you couldn't know what's wrong with the patient, couldn't monitor the patient's progress or lack of progress, wouldn't know how to treat the case and, also, post-surgical monitoring wouldn't be possible; for many other reasons, imaging is essential for brain disease.

Of course, imaging improves our understanding of the disease process; not only its anatomy but the behaviour of certain lesions and, of course, the response of the lesion to treatment. The prognosis of the patient can be improved if, judging from images, the physician can continue the same path of treatment or change the approach, and by doing so benefit the patient.

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

**JCES:** There are many techniques that are available for brain scanning: ultrasound, computed tomography (CT), magnetic resonance imaging (MRI), angiography, positron emission tomography (PET), single-photon emission computed tomography (SPECT), and combinations like PET-CT, SPECT-CT, and special MRI techniques like tractography, spectroscopy, perfusion, diffusion, functional imaging, among others.

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

**JCES:** A radiologist is a medical doctor who undergoes additional studies to obtain a degree of specialty in radiology (in our country it is four years of training).

A radiographer is a person who receives a technical degree (two years of training in Guatemala) to be able to operate the machines for the different techniques used in radiological examinations.

Neurologists and neurophysiologists can be an essential part of the team that analyses a brain examination, especially physiological imaging.

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

**JCES:** That's an extremely difficult question to answer, since in our country we don't have statistics on how many examinations are performed, especially since most of the advanced techniques like MRI, multidetector CT, SPECT or PET are available in private clinics.

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

**JCES:** Private hospitals and clinics are well equipped, they are mostly in Guatemala City, but also in Quetzaltenango, Cobán, Zacapa, and other important cities.

The public hospitals have some equipment, mainly CT, which is available in three main hospitals: Roosevelt Hospital, San Juan de Dios Hospital and Regional de Occidente Hospital. Smaller hospitals in other cities usually don't have CT, public hospitals don't have MRI units, and social security hospitals don't have CT or MRI as they subcontract services to private clinics.

**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?**

**JCES:** Actually that is not a big problem since there are many private MRI units in Guatemala City (about 10) and in Quetzaltenango (4). Usually a patient doesn't have to wait long for an appointment for an MRI examination, the main problem in our country is that the patient will have to travel to a city where MRI is available, and people may lack the financial resources to undergo this type of examination.

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

**JCES:** In our country right now, we have a very young population (more than 90% of the population is below 60 years of age), but our population is going to slowly become older. So neurodegenerative (ND) disease is an important issue, and U.S. and European agencies are almost the only ones doing studies regarding this problem; we don't have any research regarding this issue.

Research is the key to addressing this problem, since the creation of well-developed protocols of imaging is a must for creating further imaging that can help not only when neurological disease has already developed but also in earlier stages when that disease can be prevented and imaging can be performed not only for detection but also for prediction.

There has to be research and databases available on healthy people and also for specific groups at high risk for ND diseases, such as patients with cardiovascular disease, type-2 diabetes, obesity, metabolic syndrome and depression, among many others.

This will help in the development of harmonised imaging protocols for ND diseases in the early, at-risk and pre-symptomatic stages. Research for the development of molecular imaging protocols and computer-aided diagnostics could also be very important in the future.

**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?**

**JCES:** The patient is always at risk of receiving more radiation than what is permissible for a person, but the risk today is low, since the improvement of machines, facilities and protective measures have increased. Due to the potential harm that radiation can cause, there are a lot of measures that can be used to reduce the risk for the patient and also for the occupationally exposed personnel, such as lead-protected walls, windows and doors, properly calibrated machines, the use of the least radiation and time to obtain a good study, the use by radiographers of proper equipment, the use of lead aprons, thyroid collars, patient protective apronettes and other types of shielding, lead gloves, radiation barriers, and radiation protective eyewear.

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

**JCES:** Imaging will have a major role in the prevention and prediction of brain diseases in the future, as soon as research can develop a system that can help in patients with early-stage non-symptomatic ND diseases.

**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?**

**JCES:** In Guatemala, many radiologists are very careful not to make any comments regarding the patient's case, since clinicians don't like radiologists explaining the findings first because that could

confuse patients or they could misunderstand the explanation. The report will contain a detailed explanation for the referring physician. Many radiologists wait to be asked by the clinician before giving the patient a detailed explanation regarding a specific finding.

**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?**

**JCES:** In our country, there aren't any agencies that can limit health services. Often, the limitations come from lack of resources from public and social security hospitals or from patients who cannot afford to pay for their examination.