

International Day of Radiology 2014
Interview on brain imaging
The Netherlands / Prof. Charles Majoie



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The ESR spoke to Charles Majoie, professor and chief of neuroradiology at the Academic Medical Centre Amsterdam, and Chairman of the Dutch Society of Neuroradiology about how imaging helps diagnose brain disorders and what precautions are taken to ensure patient safety.

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?

Charles Majoie: A wide variety of brain diseases can be detected and diagnosed with imaging: neurovascular disorders, for example ischaemic and haemorrhagic stroke and its causes; inflammatory and infectious diseases; tumours; neurodegenerative disorders, i.e. dementias and movement disorders; congenital disorders; as well as neurodevelopmental, metabolic and toxic disorders.

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

CM: Brain imaging is of utmost importance in disease management. In a wide variety of brain diseases, the extent of abnormalities is closely related to patient prognosis and is an important guide for treatment decisions. For instance, in a patient with acute ischaemic stroke in whom endovascular treatment is considered, it is essential to be aware of the location of the vessel occlusion and the size of the infarct core to limit the number of futile endovascular procedures.

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

CM: In acute neurological disorders, like acute stroke and trauma, computed tomography (CT) and CT angiography are commonly used. For most other disorders magnetic resonance imaging (MRI) is the modality of choice. Intraoperative angiography is mainly used for neurovascular diseases and for endovascular treatment of aneurysms, arteriovenous malformations (AVMs) and ischaemic stroke in particular. In neonates, the brain can be imaged with ultrasound.

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

CM: The radiographer performs the acquisition of CT and MRI. The radiologist interprets the examinations and discusses these with other clinicians at multidisciplinary meetings.

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

CM: Yes, they are.

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?

CM: I do not know the exact number; it also depends on the indication. In our hospital, it is usually two weeks. For acute symptoms, MRI is readily available in most hospitals.

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

CM: Imaging is used increasingly for two main indications. The first is to establish the disease process that underlies the neurocognitive and neurodegenerative disorder. The most common disease

process underlying dementia is Alzheimer's disease (AD), but there are many other diseases that can cause dementia. It is important to diagnose these diseases correctly, because treatment and management strategies need to be tailored to the specific disease, even though there are no curative treatment options as yet. The second is to diagnose a neurocognitive and neurodegenerative disorder as early as possible in the disease process, such that adequate treatment can be started as soon as possible. Current treatment for AD, for instance, is only beneficial early in the disease process, by delaying cognitive decline. Early diagnosis and subsequent treatment mean that the patient can maintain independence as long as possible.

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?

CM: The as low as reasonably achievable (ALARA) principle applies to all patients. MRI is the modality of choice, and CT is only used when MRI is contraindicated, for instance in cases where the patient has a pacemaker or suffering from claustrophobia, and in acute neurological disorders such as stroke and trauma.

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

CM: In clinical practice, screening with imaging is only used for close relatives of patients who had a subarachnoid haemorrhage due to a ruptured aneurysm, to detect intracranial aneurysms. When detected these are sometimes treated to prevent morbidity and mortality related to future ruptures.

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?

CM: When a radiological examination with an abnormality is discussed with a patient, this will immediately raise questions on the best treatment. The neurologist, neurosurgeon or oncologist can best explain the impact of a finding on imaging with regard to treatment policy. Some radiologists also perform treatments using minimal invasive procedures. Interventional neuroradiologists, for instance, treat intracranial aneurysms, AVMs and ischaemic stroke. They usually discuss the images with the patient.

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?

CM: Screening should only be performed when its cost-effectiveness has been proven.

Charles Majoie is professor and chief of neuroradiology at the Academic Medical Centre Amsterdam, the Netherlands. He is an expert in the field of imaging and endovascular treatment of neurovascular diseases. He is currently chairman of the Dutch Society of Neuroradiology. Prof. Majoie is involved in multiple national and international research collaborations. He is also co-principal investigator of the MR CLEAN trial, a nationwide randomised controlled trial on endovascular treatment of acute ischaemic stroke.

