Acute stroke imaging

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In this issue of *Neuroradiology*, two review papers present the current status of acute stroke imaging.

Twenty-five years ago, CT was the method of choice for acute stroke patients. We had learned to see diminutive changes of Hounsfield units in the basal ganglia, effacement of sulci at the surface of the brain, and hyperdense artery signs in nearly all stroke-relevant vessels. Beginning with the 1990s of the last century, MRI caught up, became faster and faster, had this new fancy DWI tool, and enlarged the field-of-view with contrast-enhanced MRA, and we learned to see acute bleedings, one of the so-thought major advantages of CT. But then CT became multi-row, starting with two and exceeding 100 and 300 rows now, increasingly covering the whole brain with a single shot. Thus, CT angiograms look like DSAs and have a better spatial resolution than MR angiograms. Multi-row is unbelievable fast, perfusion of the brain is easier to understand with CT, and maybe—quantification of perfusion CT into absolute values is easier to get than with MR perfusion.

Reading both papers allows you to get an excellent and outstanding overview about the options and limitations of both methods. Surprisingly enough—at least for me: The MR experts admit that the MR perfusion technique is still difficult with regard to therapeutic consequences [1]. I never figured out how they really define critical low perfusion and I always tried to convince them to do DWI and MRA to define the tissue at risk. Switch on your anatomical knowledge about vascular territories, look at the occluded vessel, and decide whether there is a mismatch between the high-signal DWI area and the territory of the occluded vessel. That is the tissue at risk.

On the CT side, there is a lot of development to overcome this non-quantification problem in perfusion imaging, and I am convinced the solution will come much faster on the CT side than on the MR side [2]. And now I have to admit: This would be a major breakthrough, at least in studying and understanding the development of acute stroke over time and maybe, therapeutic monitoring.

After reading both papers, nobody will have a guilty conscience to do CT or MR or vice versa in acute stroke. Done as state-of-the-art both methods are excellent. CT is easier to get, less expensive, and for acute stroke patients, more convenient and more robust (with regard to image quality). Looking into the future, I am convinced that both methods still have a tremendous potential in acute stroke imaging. Susceptibility weighted imaging on the MR side offers phantastic new possibilities, direct visualisation of the thrombus, insights into the venous system, haemorrhages, and a lot of things we don't know yet. CT will cover the whole brain, and nobody knows what potential dual energy CT will and can have in acute stroke patients. Finally, if we use our methods properly, neuroradiology will have a major impact on developing new study designs for acute stroke in order to get more individualised therapeutic approaches and becoming less strict with the time window. There will be no major progress in acute stroke therapy without the aid of CT and/or MRI.

Conflict of interest statement I declare that I have no conflict of interest.

References

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