FieldStrength

Publication for the Philips MRI Community

Issue 38 – Summer 2009

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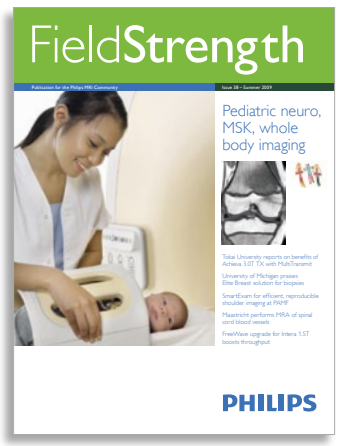

This article is part of Field Strength issue 38, Summer 2009

PHILIPS

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Maastricht University Hospital uses non-invasive MRA as an attractive alternative to catheter angiography in imaging spinal cord blood vessels.

Walter Backes, PhD.

Until recently, digital subtraction angiography was considered the only practical method of imaging the very small caliber spinal cord blood vessels. However, the Department of Radiology at Maastricht University Hospital, The Netherlands, has been evaluating MRA as an alternative tool for depicting these vessels with very positive results.

"Before undertaking clinical procedures such as aortic aneurysm surgery and correction of spinal cord vascular malformations, accurate knowledge of the location of blood vessels supplying the spinal cord is essential," explains Walter Backes, PhD, medical physicist at Maastricht University Hospital. "The challenge here, however, is that significant variations occur in individual patients' spinal cord vascular anatomy. This means that an initial procedure to locate these vessels must always be carried out, because serious complications such as paraplegia could result if a vessel supplying the spinal cord is obstructed or pinched off during surgery."

MRA as efficient, non-invasive alternative

The standard procedure for localizing these vessels is digital subtraction angiography (DSA), but this has some disadvantages. The Adamkiewicz artery (AKA) for example, one of the largest arteries supplying the spinal cord, can be connected to any one of more than twenty segmental arteries branching off the aorta. "Using DSA to locate this artery before surgery to correct an aortic aneurysm is a laborious process that may take several catheterizations and contrast injections," points out Dr. Backes. "If you're lucky, the artery might be found on the first or second attempt, but it's not uncommon for patients to have to return several times before the artery is found."

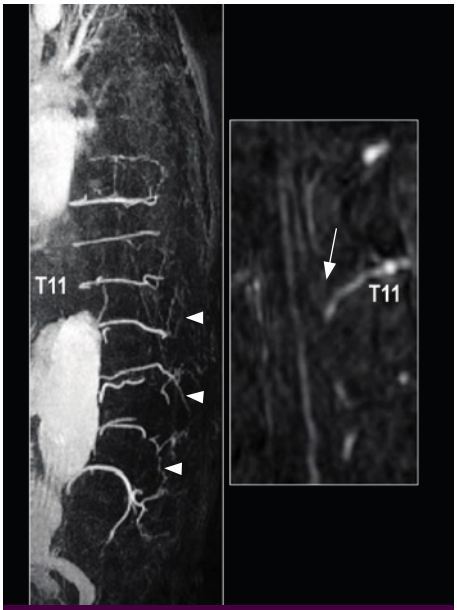
Dr. Backes and his colleagues realized that MRA could make this procedure much easier, as MRA allows use of a large FOV that enables visualization of all spinal cord arteries in one scan. They developed dedicated MRA sequences for depicting the spinal arteries and veins, offering an attractive, non-invasive, alternative to DSA. "Using these sequences, we can reliably locate the Adamkiewicz artery in just one session," says Dr. Backes.

Large FOV, high resolution make MRA ideal for spinal arteries

"Philips systems offer some important advantages in this application," points out Dr. Backes. "They enable a very large FOV – which is essential to be able to visualize the Adamkiewicz artery that can originate anywhere along the thoracolumbar spine – in combination with the high spatial resolution needed for imaging the tiny blood vessels supplying the spinal cord."

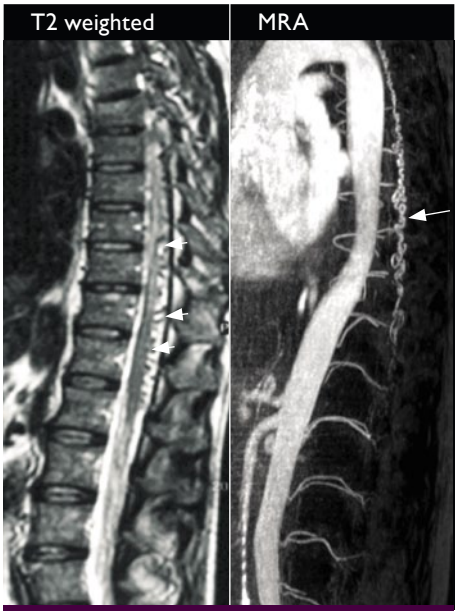
Besides for locating the Adamkiewicz artery, the Maastricht clinicians also use their dedicated 1.5T ExamCard to visualize collateral supplies to the Adamkiewicz artery which again may be located anywhere within and sometimes even outside the thoracolumbar region. "Patients often have other problems such as arteriosclerosis of the aorta with occlusions of the main tributaries. This means that the main segmental supplier may be blocked and it's necessary before surgery to look for collateral vessels that may be supplying it."

Moreover, the technique is valuable for investigating spinal cord abnormalities such as spinal dural arteriovenous fistula (DAVF) of the spinal cord, in



Collateral supply to Adamkiewicz artery

The long arrow shows the Adamkiewicz artery and the arrowheads show the collateral supply vessels. Aortic aneurysm corrected with a graft which results in loss of many of the segmental arteries in the region of interest. MRA was used to visualize the collateral supply before the procedure to minimize the possibilities of complications during surgery.



DAVF of the spinal cord

Visualization of the spinal cord in a case of dural arteriovenous fistula (DAVF). The T2-weighted image shows flow voids (arrows), and the MRA image visualizes the engorged arterialized vein.

Sacral DAVF of spinal cord

Patient presented with symptoms of DAVF. Initially five unsuccessful attempts were made to identify the arterial feeder using DSA. The feeder was subsequently identified using MRA as originating low down in the sacral region, which was later confirmed in a sixth DSA examination. This case shows the benefits of MRA.

which a spinal vein becomes engorged with arterial blood due to the presence of an arteriovenous shunt.

"DAVF can often easily be seen on T2-weighted images so you don't need to use MRA for this," explains Dr. Backes. "However, these T2-weighted images do not tell you where the fistulous connection originates. MRA is able to pinpoint non-invasively the arterial feeder of such vascular abnormalities in one imaging session. So, for this too, we find that MRA – with its large FOV covering the entire thoracic, lumbar and sacral region – is far more efficient than DSA."

MRA easier to use for locating AKA

Dr. Backes and his colleagues at Maastricht University Hospital have no doubt that MRA is an extremely useful tool for visualizing the spinal cord blood supply. "Our experience shows that MRA is a reliable, reproducible, and patient-friendly imaging technique for detecting the Adamkiewicz artery and for providing valuable information on the location of arterial feeders prior to intervention. The large FOV and the fact that it's non invasive means that in these clinical applications MRA is much easier to use than catheter angiography."

NetForum
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Visit NetForum to view or download the ExamCard 1.5T Spinal cord arteries contributed by Dr. Backes, Maastricht

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