Magnetic resonance angiography (MRA)

Is a group of techniques based on magnetic resonance imaging (MRI) to image blood vessels.

With the development of CTA, MRA and 3D-DSA, more and more patients with intracranial aneurysms have been detected [1) 2)].

Modalities

see 3D Magnetic resonance angiography

see Contrast enhanced Magnetic resonance angiography

see Time-of-flight magnetic resonance angiography

see Phase contrast magnetic resonance angiography

see Time-resolved magnetic resonance angiography

Indications

Magnetic resonance angiography is used to generate images of arteries (and less commonly veins) in order to evaluate them for stenosis (abnormal narrowing), occlusions, aneurysms (vessel wall dilatations, at risk of rupture) or other abnormalities.

MRA is often used to evaluate the arteries of the neck and brain, the thoracic and abdominal aorta, the renal arteries, and the legs (the latter exam is often referred to as a “run-off”).

Follow-up of intracranial aneurysms treated with endovascular coil occlusion

Is proposed as a safer and less expensive alternative to the reference standard, DSA, in the follow-up of intracranial aneurysms treated with endovascular coil occlusion.

A systematic review and meta-analysis to evaluate the accuracy of TOF-MRA and contrast-enhanced MRA in detecting residual flow in the follow-up of coiled intracranial aneurysms. Literature was reviewed through the PubMed, Cochrane, and EMBASE data bases. In comparison with DSA, the sensitivity of TOF-MRA was 86% (95% CI: 82-89%), with a specificity of 84% (95% CI: 81-88%), for the detection of any recurrent flow. For contrast-enhanced MRA, the sensitivity and specificity were 86% (95% CI: 82-89%) and 89% (95% CI: 85-92%), respectively. Both TOF-MRA and contrast-enhanced MRA are shown to be highly accurate for detection of any recanalization in intracranial aneurysms treated with endovascular coil occlusion [3)]

Magnetic resonance angiogram (MRA) of the brain is a widely employed non-invasive test to diagnose aneurysms. However, its overall accuracy is less than digital subtraction angiography and is prone to give false-positive or false-negative results. False-negative results can be seen with hemorrhage,

lipoma, dermoid, posterior lobe of the pituitary gland, and the flow artifacts.

MR angiogram can result in artifacts at ACOM which may be mistaken for aneurysm. Such pseudoaneurysms have characteristic appearance and should be followed up with non-invasive tests [4].

The role of magnetic resonance angiography (MRA) in the evaluation of patients with Blunt traumatic vertebral artery injury has not been fully established [5].

Magnetic resonance angiography for intracranial arteriovenous malformation

see Magnetic resonance angiography for intracranial arteriovenous malformation.

Magnetic resonance angiography for intracranial aneurysm

Magnetic resonance angiography for intracranial aneurysm

Case series

The possibilities and limitations of MRA in the evaluation of intracranial aneurysms were investigated in this study. 54 patients, 30 with acute SAH were diagnosed using the three dimensional time-of-flight MRA in comparison with a conventional four vessel digital subtraction angiography prior to surgery. Furthermore, postoperative MRA was performed to assess clip placement and vessel patency and to search for innocent additional aneurysms in patients with emergency surgery due to intracerebral hemorrhage causing mass effect in whom preoperatively only the side of the lesion was investigated in DSA. 64 aneurysms in all vessel territories were detected. Three aneurysms were missed in MRA and there were three false positive results. Four baby-aneurysms were missed by both imaging modalities and were found during surgery. In all patients with CT scans suspicious of aneurysms MRA was able to detect or rule out the aneurysm. Postoperative MRA to demonstrate clip placement and vessel patency was not possible due to susceptibility artefacts. MRA should be the diagnostic procedure of first choice in CT findings suspicious of aneurysms. The follow-up of confirmed aneurysms is safely possible. MRA is very well applicable in the acute setting after SAH. The axial acquisition films and the rotatable maximum intensity projection reconstructions provide useful insights into the location of the aneurysm and its neighboring structures thus influencing the preoperative planning of surgical strategies. Keeping the limitations in mind it is a safe tool in the evaluation of aneurysms, especially with the rapidly improving postoprocessing possibilities [6].

1)
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5)

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