Journal of Cardiovascular Magnetic Resonance

Poster presentation

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The valency of Magnetic resonance angiography (MRA) in patients with metal implants in the clinical routine

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from 13th Annual SCMR Scientific Sessions
Phoenix, AZ, USA. 21-24 January 2010

Published: 21 January 2010

Journal of Cardiovascular Magnetic Resonance 2010, **12**(Suppl 1):P297 doi:10.1186/1532-429X-12-S1-P297

This abstract is available from: http://jcmr-online.com/content/12/S1/P297

Introduction

Magnetic resonance angiography (MRA) has shown a diagnostic accuracy, which is comparable to conventional digital subtraction angiography (DSA) regarding the high-grade stenosis. The advantage of MRA is the minimal invasiveness, resulting in an increasing employment in clinical routine. However, the image quality of MRA can be hampered by artifacts due to metal implants of joints and bones after surgery.

Purpose

The purpose of this study was to evaluate the impact of metal implants on image quality of MRA.

Methods

We reviewed 587 MRAs performed during the last three years on a 1.5 Tesla whole-body MR scanner (Magnetom Avanto, Siemens Erlangen, Germany). Using a dedicated MRA coil and moving bed technique, sequential FLASH 3D sequences with iPAT factor of 2 at three levels were acquired (I: TR = 2.97 ms; TE = 0.93 ms; FoV 500 × 429; matrix 448 × 384; II: TR = 3.16 ms; TE = 0.98 ms; FoV 500 × 393; matrix 448 × 352; III: TR = 3.26 ms; TE = 1.01 ms; FoV 500 × 288; matrix 448 × 288). After the first run, these sequences were repeated under administration of a three-phase bolus of gadobenate. The subtracted images were reconstructed with the help of maximum intensity projection.

Results

In 26/587 patients the image quality was lowered due to venous overlapping. In 17/587 patients the arteries were illustrated incompletely. 5/587 investigations were affected by movement artefacts. 15/587 showed insufficient contrast enhancement. 60 Patients had metal implants of joints and bones but only 14/60 of them showed metal artefacts decreasing the image quality. A complementary digital substraction angiography (DSA) had to be carried out in 15/587 cases or in 4/60 patients with metal implants. Furthermore the perfomed DSA examinations showed a very good correalation to the MRA examinations (specifity 97%, sensitivity 85%).

Conclusion

Although there are artefacts in a low number of cases which can affect the image quality, MRA is a stable and very helpful method for the clinical routine, also in patients with metal implants.