

3D Time resolved MRA: Comparison of TREAT (Time –resolved echo-shared angiographic technique) of the Intracerebral circulation at 1.5 and 3 Tesla.

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Introduction: To obtain clinically useful intracranial MRA, very short scan durations and high spatial resolution were necessary to have a selective arterial phase without venous overlay and a vessel anatomy analyze. Recently, 3.0T have become available. The purpose of this study is to compare image quality, SNR, temporal/spatial resolution using Time Resolved (TR) MRA of the intracranial vessels at 1.5T with a higher spatial resolution at 3.0T. (1-5)

Materials and Methods: Fifteen Patients with brain tumors were scanned at 1.5T with a 3D axial TR MRA using TREAT-VIBE (volumetric interpolated breath-hold examination) with iPAT factor 2, slice thickness of 3mm, 36 partitions, voxel size 1.3x1.3x3 mm. Ten patients with brain tumors were scanned at 3.0T with a 3D axial TR MRA using TREAT-VIBE with iPAT factor 3, slice thickness of 1mm, 36 partitions voxel size 1x1x1mm. A bolus of 5ml of Gadopentate dimeglumine (Magnevist, Magnevist, Berlex Laboratories) was administered at 3ml/s followed by a 30ml saline flush for both TR MRAs. Observers rated the images for the conspicuity and definition based on a three-point scale ranging from well defined (graded as 3), seen (graded as 2), or poorly defined (graded as 1), while artifacts and geometric distortion determined was evaluated to be either absent (3), present (2), or severe(1).

Table 1. Comparing parameters for Time Resolved MRA at 1.5T and 3T.

	1.5 T	3T
TR ms	2.3	2.8
TE ms	0.8	1.17
BW Hz/pixel	900	830
Time acquisition s	1.7	2.3
Slice thickness mm	3	1
Number of partitions	36	36
Flip Angle °	25	12
Voxel Size	1.3x1.3x3	1x1x1mm

Results: TR MRA at 1.5T provided a temporal resolution of 1.7 s and a slice thickness of 3mm with a spatial resolution of 1.3x1.3x3 mm. TR MRA at 3T provided a temporal resolution of 2.25 s and a slice thickness of 1 mm with a spatial resolution of 1x1x1 mm (Table 1) and multiple views. Images at 3.0T scored 43 points (out of possible 48), images at 1.5T, scored 36. There was significantly higher SNR and CNR at 3.0T compared with 1.5 T.

Conclusion: TR MRA with an iPAT factor of 3 at 3.0T provides comparable image quality and temporal resolution, with higher spatial resolution (isotropic 1 mm voxel) compared to 1.5 T.

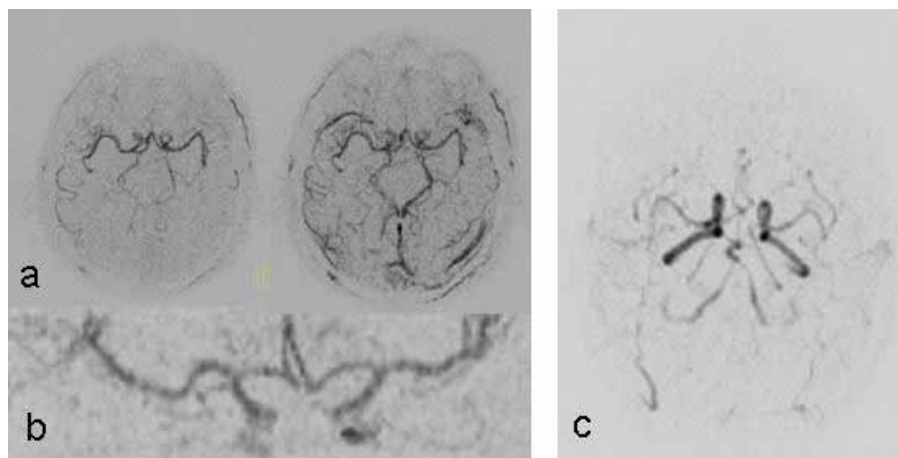


Fig 1. TR MRA at 3.0T in axial (a) and coronal (b) planes with iPAT 3 and axial (c) TR MRA at 1.5T with iPAT 2. Arterial phase is well separated from the venous phase.

References

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