The Artifacts and Pitfalls of e3D-TOF MR Angiography in the Evaluation of Cerebrovascular Disease

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Purpose
To evaluate and understand the artifacts and pitfalls of e3D-TOF MR angiography (e3D-TOF MRA), compared with conventional angiography, in the patients with suspected cerebrovascular disease.

Materials & Methods
Subjects in this study included 82 patients with clinical symptoms of cerebrovascular accident who underwent conventional angiography and e3D-TOF MRA using 1.5 T MR scanner over past 2 years. Two independent radiologists recorded type, frequency, and degree (mild, moderate, severe) of artifacts compared them with conventional angiography. Artifacts in e3D-TOF MRA were classified as flow related, and flow unrelated, by patients, hardware, acquisition, and postprocessing techniques.

Results
Type and frequency of flow related artifacts included saturation artifact (100%), dephasing artifact (97.6%), artifact by in-plane flow (51.2%), turbulence artifact (38%), phase encoding ghost artifact (2.4%). Type and frequency of flow unrelated artifacts included magnetic susceptibility artifact (100%), MIP artifact (100%), paramagnetic substance artifact (100%), stair-step artifact (2.4%). Paramagnetic substance artifacts by orbital fat and paranasal sinus mucosa (100%), hematoma (8.5%) were seen. Severe degree of artifacts was not recorded.

Conclusion
An understanding of the causes and physical principles of variable artifacts will enable the radiologists to avoid and minimize misinterpretation of e3D-TOF MRA.

References