



Image Report

Magnetic resonance angiography with ultrashort echo time evaluates cerebral aneurysm with clip

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ABSTRACT

Contrast-enhanced computed tomography angiography is usually valuable for the evaluation of clipped cerebral aneurysm, but it has side effects of contrast medium. Time-of-flight magnetic resonance angiography (MRA) is a non-invasive and fast method. However, clip-induced artifact limits assessment of the artery in the vicinity of a clip. MRA with ultrashort echo time (TE) reduces metal artifact. We use MAGNETOM Aera 1.5T (SIEMENS, München, Germany) and perform pointwise encoding time reduction with radial acquisition (PETRA)-MRA using ultrashort TE for the assessment of the cerebral aneurysm after clipping. We, herein, presented two representative cases with a clipped aneurysm which could be evaluated by PETRA- MRA. Especially in one of them, the neck remnant was revealed by PETRA-MRA. PETRA-MRA can reduce the time and the invasiveness and may be helpful for the usual follow-up of the clipped aneurysm with the development of MRA technology in the future.

Keywords: Cerebral aneurysm, Clipping, Less invasive, Magnetic resonance angiography, Ultrashort echo time

We would like to report the usefulness of magnetic resonance angiography (MRA) with ultrashort echo time (TE) for the assessment of the cerebral aneurysm after clipping. Non-invasive methods are better for the assessment of the cerebral aneurysm after clipping. Contrast-enhanced computed tomography angiography (CTA) is usually valuable,^[4] but it has side effects of contrast medium. Time-of-flight (TOF) MRA is a non-invasive and fast method. However, clip-induced artifact limits assessment of the artery in the vicinity of a clip, especially of aneurysm neck remnants.^[1]

MRA with ultrashort TE reduces metal artifact.^[2,3] We use MAGNETOM Aera 1.5T (SIEMENS, München, Germany) and perform pointwise encoding time reduction with radial acquisition (PETRA)-MRA using ultrashort TE for the assessment of the cerebral aneurysm after clipping.

Case 1: clipping for the unruptured aneurysm at the right middle cerebral artery using the Sugita titanium clip (Mizuho, Tokyo, Japan). CTA described M1 and M2 portion of the middle cerebral artery and the vicinity of the clip in detail (arrow, Figure 1a). TOF-MRA did not describe them due to clip-induced artifact (arrow, Figure 1b), but PETRA-MRA revealed the arteries (arrow, Figure 1c). Case 2: clipping for the ruptured aneurysm at the left internal carotid artery using the same clip. CTA described the aneurysm neck remnant due to incomplete clipping (arrow, Figure 1d), but it was indistinguishable by TOF-MRA (arrow, Figure 1e). However, PETRA-MRA revealed and morphologically evaluated it (arrow, Figure 1f).

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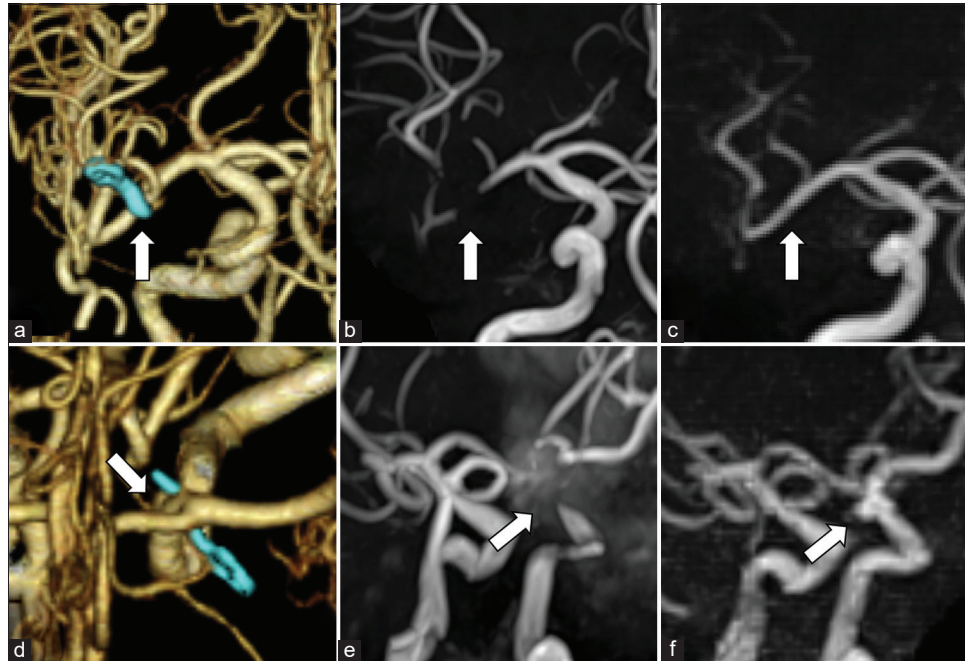


Figure 1: Case 1: clipping for the unruptured aneurysm at the right middle cerebral artery using the Sugita clip made of titanium (Mizuho, Tokyo, Japan). Computed tomography angiography described M1 and M2 portion of the middle cerebral artery and the vicinity of a clip in detail (arrow, a). Time-of-flight magnetic resonance angiography (TOF-MRA) did not describe them due to clip-induced artifact (arrow, b), but pointwise encoding time reduction with radial acquisition (PETRA)-MRA revealed the arteries (arrow, c). Case 2: clipping for the ruptured aneurysm at the left internal carotid artery-posterior communicating artery bifurcation using the Sugita clip made of titanium. CTA described the aneurysm neck remnant due to incomplete clipping (arrow, d), but it was indistinguishable by TOF-MRA (arrow, e). However, PETRA-MRA clearly revealed the remnant and could morphologically evaluate it (arrow, f).

To the best of our knowledge, this is the first report on the usefulness of PETRA-MRA for the assessment of the cerebral aneurysm and its neck remnant after clipping. PETRA-MRA can reduce the time and the invasiveness and may be helpful for the usual follow-up of the clipped aneurysm with the development of MRA technology in the future.

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DECLARATION OF PATIENT CONSENT

The authors certify that they have obtained all appropriate patient consent.

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Conflicts of interest

There are no conflicts of interest.

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