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Short Commentary Open Access

A Commentary on 'Diagnose Vessel Course Distal to Occluded Artery using Heavily T2-weighted MRI in Mechanical Thrombectomy

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Short Commentary

In endovascular thrombectomy for acute ischemic stroke due to large-vessel occlusion, occluded vessels are invisible on MRA or DSA. Heavily T2-weighted MRI sequence, which offers good contrast between cerebrospinal fluid and other brain structures, may contribute to resolve this issue. In this study the efficacy of this sequence in estimating vessel courses including unexpected aneurysms of the portion more distal to the occlusion site in endovascular thrombectomy is evaluated from the point of reliability, feasibility, and contribution to safety and also the detectability of aneurysms [1-4]. The heavily T2-weighted MRI sequence can contribute to improving the safety of maneuvers by clarifying the course of occluded vessels in endovascular thrombectomy for large-vessel occlusion [5].

The effectiveness of mechanical thrombectomy for acute ischemic stroke primarily using contact aspiration and/or stent retriever combined with internal treatment including intravenous tissue plasminogen activator (tPA) therapy has been demonstrated in randomized controlled trials (RCTs) and a meta-analysis. Delivery of clot retrieval devices is essential for such treatment, but a microguidewire or microcatheter often needs to be inserted into the vessel in the distal portion over a clot. This procedure warrants careful maneuvering with a sense of uneasiness to avoid bleeding due to perforation in the presence of sharp curves in vessels, small perforating arteries, or unexpected aneurysms. Especially, it is very important to recognize the presence of invisible aneurysms, which may lead to cause serious bleeding and disastrous result. However, information on the vessel course distal to the obstruction site is not presented on MRA or DSA. Though the occluded vessel may be visualized partially and slightly on CT/CTA, it is hard to say that it provides enough information about blood vessel depiction [6,7].

To resolve this issue, we focused on heavily T2-weighted MRI sequence. Heavily T2-weighted imaging provides a good contrast between intracranial fluids like cerebrospinal fluid and other brain structures such as nerve, vessels, or bone structures [8]. This MR sequence has been utilized in the treatment of cochlear disease [9], cerebellopontine angle tumor [10], microvascular decompression [11] or vertebrobasilar diseases [12]. This sequence enables an estimate of invisible vessel course or the existence of aneurysms [13].

In this study, reliability, feasibility, and contribution to safety of the heavily T2-weighted MRI sequence were investigated and also assessed the detectability of aneurysms. The heavily T2-weighted imaging depicted the contours of occluded vessels clearly, so the course of the vessel is easily identified from serial thin slices. High rate of the matching of vessel courses before and after treatment indicates the reliability of this method. No procedure-related hemorrhagic complications like as perforation of arteries or subarachnoid hemorrhage (SAH) demonstrates the safety of this method. The diagnostic MRI sequences comprised diffusion-weighted imaging DWI, FLAIR, cranial and cervical time of flight (TOF)-MRA, and coronal-section heavily T2-weighted imaging including occluded vessels. Acquisition time is 1 min 31 s in this pulse sequence and a total scan time is 11 min 27 s. The increase in the scan time by having added this sequence did not greatly influence the whole treatment time. The detection ratio of aneurysms was high. Aneurysm size is the only significant factor associated with preventing the depiction of aneurysms among factors associated with detectability of aneurysms the location, size, direction of development, and contact with other brain structures.

The heavily T2-weighted MRI sequence is useful for depiction of occluded vessels in endovascular thrombectomy for acute ischemic stroke due to large-vessel occlusion. This sequence may contribute to avoid vessel perforation or rupture of unexpected aneurysms existing distal to occluded arteries.

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