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Detection of true aneurysm using high resolution time-of-flight magnetic resonance angiograph (HR-MRA) at 3.0 Tesla: correlation with standard digital subtraction angiography (DSA)

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PURPOSE: 1. To evaluate accuracy of 3T HR-MRA in detecting aneurysm compared with conventional MRA (C-MRA)
2. To prove potential diagnostic advantage of HR-MRA using correlation with DSA

MATERIALS AND METHODS: 32 patients with 43 possible aneurysms on C-MRA were underwent 3T HR-MRA and DSA. The protocols of HR-MRA were following: TR 29.0, TE 4.6, matrix 512×512, FOV 20 cm, and thickness 0.5 mm with 8 channel head coil. Two blinded neuroradiologists reviewed C-MRA and HR-MRA in the detection of aneurysms, independently. For each possible aneurysm, readers recorded the location and their level of confidence with a 3 point scale (0: no, 1:suspicious, and 2: definite aneurysm). 2D or VR-DSA were obtained and used as the standard of reference. The accuracy was calculated in addition to the sensitivity and specificity of HR-MRA compared to C-MRA. In particular, cases with advantage of detection on HR-MRA were evaluated in detail.

RESULTS: DSA revealed 35 aneurysms in 25 patients and no aneurysm or ID in 8 cases in 7 patients. Multiple aneurysms were 12 cases in 8 patients. On HR-MRA, reviewers exactly detected 40, 37 cases, superior to C-MRA (29, 32 cases). On the lesion-based evaluation, accuracy, sensitivity, and specificity of were 89.5%, 91.5, and 81.3% on HR-MRA and 72.1%, 81.5%, and 31.3% on C-MRA, respectively. Each 3 and 5 suspicious aneurysm on C-MRA were re-categorized as definite aneurysm.

CONCLUSION: HR-MRA had a high accuracy, sensitivity and specificity for the detection of intracranial aneurysms, comparing C-MRA. In equivocal aneurysm on C-MRA, HR-MRA can be a useful tool and replace DSA.