

Hemodynamically Induced Aneurysm-mimicking Findings at Anterior Communicating (A-com) Artery Area due to Anatomical Variation on 3D-TOF MRA

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목적 : To determine the relationship between anatomical variation at A-com. artery area and hemodynamically induced aneurysm-mimicking findings on 3D-TOF MRA clinically and experimentally.

대상 및 방법 : Sixty-two patients who had no aneurysm at A-com artery on DSA were evaluated with MRA. MRA was performed with 1.5T MR machine (Vision, Siemens). Scan parameters of MRA included TR/TE/FA=30/6.4/25°, 1512*192 of matrix with MIP technique. The occurrence of signal defect at shoulder area of bifurcated A-com artery on MRA was evaluated for the relationship between the symmetry of bilateral ACA and the patency of A-com artery. DSA images were acquired at both ICA and VA. To analyze hemodynamical factors of signal defect, experimental studies of MRA and DSA were performed with elastic silicon phantom using a conducting pulsatile pump. We also compared the results with those of computational fluid dynamics (CFD).

결과 : In clinical study, 21/62 (34%) of patients had anatomical variation of aplastic (4 patients) or hypoplastic (17 patients) on one side of ACA and introduced bifurcation shaped ACA on the contralateral side. The signal loss due to turbulent flow at shoulder area of bifurcated ACA MRA images was observed in 14/21 (67%) of patients. Seven of 62 (11%) showed extreme signal defect that could be a cause of wrong interpretation as aneurysm. Experimental studies with MRA revealed the high signal region at the inflow zone and signal defect due to turbulent flow at shoulder area of bifurcation of silicon phantom. These flow patterns could induce the aneurysm-mimicking findings on MIP technique. Results of DSA and CFD were well matched with those of MRA study.

결론 : As 34% of the patients had unilateral hypoplastic or aplastic variation of ACA, extreme signal defect due to hemodynamical causes at shoulder area of bifurcated A-com artery area could introduce aneurysm-mimicking findings into 7/62 (11%) of the patients.