

Double-subtraction MIP MR Angiography to detect the artery of Adamkiewicz -differentiating it from drainage vein-

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PURPOSE

We assess the ability of double-subtraction magnetic resonance angiography (MRA) to depict the artery of Adamkiewicz (AKA) differentiating from drainage vein.

MATERIALS AND METHODS

One hundred and seventy patients (male: 123, female: 47, 17-84 (mean, 67.0) y.o.) with thoracoabdominal lesion (aneurysm 130, dissection 39, and pseudoaneurysm 1) underwent enhanced MRA to detect the AKA. MRA was performed with a 1.5-T system by the 5-phases enhanced 3D-f GRASS with double dose of bolus contrast and saline injection. We measured the signal intensity of the AKA and drainage vein to demonstrate the signal-noise ratio (SNR), contrast-noise ratio (CNR) and the necessary to use the double-subtraction technique. We also measured the branching level relation between the AKA and drainage vein.

RESULTS

AKA was detected in 130 (81.3 %) out of 170 patients (Fig 1). The branching levels were as follows; left (T8 6, T9 48, T10 40, T11 43, T12 14) and right (T8 2, T9 3, T10 1, T11 1). Two AKAs were detected in 16 patients. The drainage vein was detected in 142 (83.5 %). The connecting levels were as follows; left (T9 1, T10 4, T11 8, T12 20, L1 20, L2 12) and right (T9 2, T10 4, T11 9, T12 21, L1 27, L2 17, below L2 5)). Only 6 (4%) out of 142 patients presented upward drainage vein branching. According to SNR (Fig 2a) and CNR, there were no significant difference between the AKA and drainage vein in arterial phase, but using the subtraction technique (Fig 2b), the AKA could be presented higher signal intensity than that of the drainage vein ($p < 0.001$).

CONCLUSION

The AKA was detected in a large percentage of patients. Double subtraction MRA is useful to detect the AKA when it is necessary to differentiate from drainage vein.

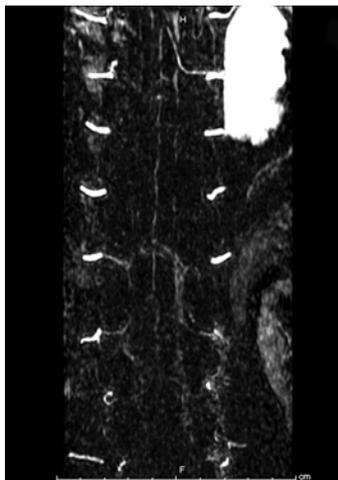


Fig 1 Double-subtraction MRA

The AKA is seen at the left T8 level. Note the characteristic hairpin-curve appearance of the union between AKA and the anterior spinal artery.

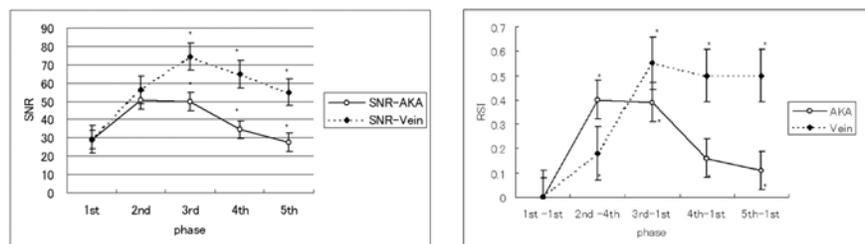


Fig 2(a) Signal-to-noise ratio; AKA and drainage vein appear at the second phase, there is no significant difference in SNR ($p=0.932$). (b) Relative-signal-intensity ratio ($RSI = (S_{\text{phase}} - S_{\text{sub}})/S_{\text{phase}}$); At the second phase, the AKA signal is significantly more intense than that of the drainage vein ($p < 0.001$). The AKA signal diminishes during the following phases. The drainage vein signal intensity is high in the third phase and remains high during the following phases. (* $P < 0.001$)