# Vertebral artery dissection case series

From January 2015 to December 2021, symptomatic patients who underwent 3.0 T MR SWI were recruited. For the study group, transfemoral cerebral angiography-proven lesions were included, while a 1:1 matched control group with MR angiography was included. Image features of SWI were evaluated. Diagnostic performance and interobserver agreements were calculated for detecting VAD with stenosis and UIA greater than 7 mm.

Results: Total of 110 patients (mean age: 60.92 years, female: 60/110) were included. In the study group (N = 55), 21 patients (38.2%) had VAD, while 34 patients (61.8%) had UIA. For SWI-detectable VAD, larger parent artery (PA)-dilatation ratio was observed (1.36 vs. 1.84, p = 0.034). For SWI-detectable UIA, larger PA-dome ratio (1.32 vs. 1.90, p = 0.020) and larger PA-height ratio (1.25 vs. 1.77, p = 0.005) were observed. The diagnostic performance and kappa values for VAD with stenosis were as follow: sensitivity: 91.7 (95% CI: 61.5-99.8); specificity: 93.9 (95% CI: 87.2-97.7); κ: 0.80. The diagnostic performance for UIA larger than 7 mm were as follow: sensitivity: 87.5 (95% CI: 47.4-99.7); specificity: 95.1 (95% CI: 88.9-98.4); κ: 0.73.

Conclusion: SWI-detectable lesions were VAD with a larger PA-dilatation ratio, and UIA with a larger PA-dome ratio, and PA-height ratio. SWI was able to accurately detect VAD with stenosis and UIA larger than 7 mm with substantial interobserver agreements [1)].

---

37 patients diagnosed with VAD were evaluated by MR imaging in the acute phase of onset between January 2014 and May 2019. The clinical onset of VAD was categorized into 3 subtypes: (1) incidentally detected (incidental group), (2) sudden headache without cerebral ischemia and/or intracranial hemorrhage (headache group), and (3) hemorrhagic onset (hemorrhage group). Three-dimensional T1-weighted fast spin-echo sequences were obtained before and after contrast material injection, and the contrast ratio (CR) of the aneurysm wall against the pituitary stalk was calculated as the indicator of Circumferential enhancement along the aneurysm wall (CEAW) by magnetic resonance (MR) vessel wall imaging.

The contrast ratio (CR) values of VAD in the hemorrhage group were significantly higher than those in the headache group (0.95 vs. 0.65, $p < 0.05$), and the headache group had significantly higher CR values than the incidental group (0.65 vs. 0.56, $p < 0.05$). On receiver operating characteristic curve analysis, the optimal cutoff value of CR to distinguish the hemorrhage group from the headache group was 0.83 and that to distinguish the headache group from the incidental group was 0.61.

The extent of CEAW precisely reflected the deleterious impact of VAD in the acute stage, including hemorrhagic presentation. The predictive value of CEAW for the prognosis of unruptured VAD should be evaluated in future studies [2)].

---

Clinical data of 96 patients with VDAs treated by LVIS stent and Enterprise stent assisted coil were analyzed retrospectively between January, 2013 and June, 2017.Of all, the LVIS Stent assisted coiling was performed in 28 patients (LVIS-stent group) and Enterprise in 68 patients (Enterprise-stent group). The clinical and imaging follow-up were performed. The instant embolization rate, complications, and recurrence rate were analyzed and compared between the two groups.

Instant angiographic results:in the LVIS stent group, complete occlusion was achieved in 17 VDAs (60.7%), near-complete occlusion in 10VDAs (35.7%), and partial occlusion in 1 VDA (3.6%). In the Enterprise stent group, complete occlusion was achieved in 27 VDAs (39.7%), near-complete occlusion in 34VDAs(50.0%), partial occlusion in 7VDAs (10.3%). Procedure-related complications occurred in 3 patients (10.7%) in LVIS stent group and 3 patients (4.4%) in Enterprise stent group. DSA follow-up was performed during 6 to 12 months after surgery, and 10 patients with vertebral artery dissection aneurysm recurred, 2 in the LVIS group and 8 in the Enterprise stent group. The latest modified Rankin Scale score was 0 in 55 patients,1 in 13, 2 in 1, 3 in 1, and 6 in 1. Among them, all follow-up patients in the LVIS stent group had good prognosis, while in the Enterprise stent group, 50 patients (94.4%) had a good prognosis.

The Stent assisted coiling have a higher degree of embolization in the vertebral artery dissection aneurysms, a higher rate of near-total embolization, a lower incidence of neurological complications, and a good prognosis. The complete and near-complete occlusion rates and the incidence of neurological complications in the LVIS group was higher than that in the Enterprise group and the recurrence rates in the LVIS group was lower than that in the Enterprise group, both with no statistically significant difference [3].

1)
Bae DW, Lee JH, Shin JH, Ihn YK, Sung JH. Detection of cerebral aneurysm and intracranial vertebral dissection using non-enhanced magnetic resonance imaging in emergency setting: Emphasis on magnitude image of susceptibility-weighted image. Interv Neuroradiol. 2022 May 31:15910199221104613. doi: 10.1177/15910199221104613. Epub ahead of print. PMID: 35642276.
2)
Saito A, Fujimura M, Endo H, Omodaka S, Kanoke A, Sato K, Tominaga T. Diagnostic Value of Contrast-Enhanced Magnetic Resonance Vessel Wall Imaging on the Onset Type of Vertebral Artery Dissection. Cerebrovasc Dis. 2019 Nov 26:1-8. doi: 10.1159/000503852. [Epub ahead of print] PubMed PMID: 31770765.
3)
Wang LY, Feng X, Zhang BR, Ma N, Guo EK, Peng F, Tong X, Liu AH. [Efficacy analysis of LVIS and Enterprise stent assisted coil in the treatment of vertebral artery dissection aneurysm]. Zhonghua Yi Xue Za Zhi. 2019 Mar 5;99(9):685-689. doi: 10.3760/cma.j.issn.0376-2491.2019.09.010. Chinese. PubMed PMID: 30831618.