

Pseudostenosis of vertebral artery ostium on 3D contrast-enhanced MRA in comparison with motion of aortic arch on dynamic 4D MRA

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PURPOSE: Vertebral artery ostium is a frequent site of pseudostenosis on 3D contrast-enhanced MRA (CE-MRA). Therefore, there is a high false positive rate in diagnosing vertebral artery ostial stenosis using CE-MRA. Motion of aortic arch due to cardiac and respiration is considered as a cause of pseudostenosis at this site. The purpose of this study is to confirm the hypothesis that pseudostenosis of vertebral artery ostium is associated with motion of aortic arch.

MATERIALS AND METHODS: 47 patients were enrolled in this study. They underwent CTA, CE-MRA, and dynamic 4D MRA with an interval of 6.87 ± 9.89 days (mean \pm SD). All CTA was performed with 64-channel MDCT. CE-MRA was performed after injection of Gadovist (0.1 cc/kg). Dynamic 4D MRA was performed after injection of 0.1 ml of Gadovist. CTA was used as a reference standard of vertebral artery ostial stenosis. We measured percent stenosis of vertebral artery ostium using NASCET criteria. VA ostium was graded as < 50% stenosis, 50–99% stenosis, and occlusion. Motion of aortic arch was visualized with temporal resolution of 1-second on 4D MRA. Distance between the highest position and lowest position of aortic arch during the dynamic 4D MRA was measured as motion of aortic arch. Age, route of intravenous contrast media, motion of aortic arch, and normal distal diameter of VA were statistically analyzed.

RESULTS: Total 17 patients showed unilateral or bilateral pseudostenosis of vertebral artery ostia (36.2%). There were 23 pseudostenoses of vertebral artery ostia out of 94 (24.5%). Patients with pseudostenosis showed higher motion of aortic arch (3.61 ± 1.87 vs. 2.05 ± 1.97 cm) and older age (71.3 ± 8.9 vs. 64.2 ± 13.4 year-old). Route of intravenous contrast media and normal distal diameter of VA were not associated with pseudostenosis.

CONCLUSION: Pseudostenosis of VA ostia is frequently seen on CE-MRA. Pseudostenosis of VA ostia should be considered when higher motion of aortic arch is visualized on dynamic 4D MRA.