

## Suboptimal contrast enhanced head and neck MR angiography due to venous reflux: analysis of causative factors

Dong Jae Shin, Eun Ja Lee

*Dongguk University Ilsan Hospital, Korea.*

[ejleebae@hanmail.net](mailto:ejleebae@hanmail.net)

**PURPOSE:** Contrast-enhanced head and neck MRA may be degraded by venous stasis and reflux of contrast into the jugular veins. The purpose of this study was to analysis of causative factors of venous reflux on contrast enhanced head and neck MR Angiography

**MATERIALS AND METHODS:** Two hundred patients underwent contrast enhanced head and neck MRA performed with contrast injection into the left (n = 100) or right (n = 100) arm. The age, sex, body mass index (BMI), hypertension, diabetes mellitus were reviewed in all patients. In patients with left-arm injections the minimum diameter of left brachiocephalic vein measured at the retrosternal region, the diameter of aortic arch, the distance between sternum and vertebral body were measured on the reconstructed axial images from the source images. And these factors and the venous stasis/reflux on contrast enhanced were analyzed.

**RESULTS:** There was no significant difference in the mean age, sex, BMI, hypertension, diabetes mellitus between the left-arm injection patients and right-arm injection patients. Of the 200 examinations, 29 patients showed central venous stasis/reflux. The central venous stasis/reflux were significantly higher in patients with left-arm injection than in those with right-arm injection (left n = 24, right n = 5,  $p < 0.001$ ). The patients with venous stasis/reflux had a higher mean age than in patients without stasis/reflux significantly (66.6 vs. 60.3 years,  $p = 0.047$ ). Between the two groups, there were no statistically significant differences in sex ( $p = 0.062$ ), BMI ( $p = 0.539$ ), hypertension ( $p = 0.496$ ), diabetes mellitus ( $p = 0.574$ ). In patients with left-arm injection, the minimum diameter of the left brachiocephalic vein was significantly smaller in patients with central venous stasis/reflux than in patients without stasis/reflux (2.62 vs. 4.77 mm,  $p < 0.001$ ). Between the two groups with left-arm injection, there were no statistically significant differences in age, sex, BMI, hypertension, diabetes mellitus, the diameter of aorta, and the distance between sternum and vertebral body.

**CONCLUSION:** Compression of the left brachiocephalic vein can lead to venous reflux that may degrade the quality of contrast enhanced head and neck MRA. On contrast enhanced head and neck MR angiography, left arm injection should be avoided especially in the elderly patients.