

## Retrograde venous flow in dural sinus and internal jugular vein on 3D TOF MRA

Bum-soo Kim<sup>1</sup>, Jinhee Jang<sup>1</sup>, Hyun Seok Choi<sup>1</sup>, So-Lyung Jung<sup>1</sup>, and Kook-Jin Ahn<sup>1</sup>

<sup>1</sup>Department of Radiology, Seoul St.Mary's Hospital, The Catholic University of Korea, Seoul, Seoul, Korea

Target audience: General radiologists and neuroradiologists

Purpose: Purpose of this study is to assess the venous reflux flow in internal jugular vein (IJV), sigmoid/transverse sinus (SS/TS) and inferior petrosal sinus (IPS) on the brain and neck TOF MRA.

Methods : Total 3475 patients (1526 men, 1949 women, age range 19-94, median age 62 years) with brain and neck 3D TOF MRA at 3T (n=2292) and 1.5T (n=1183) were identified from the radiology database. Rotational MIP images of 3D TOF MRA were assessed for the presence of reflux flow in IJV, IPS and SS/TS.

Results: Fifty-five patients (1.6%) showed reflux flow, all in the left side. It was more prevalent in female (n=43/1949, 2.2%) than in male (n=12/1526, 0.8%) (p=0.001). Mean age of patients with reflux flow (66-year-old) was older than those (60-year-old) without reflux flow (p=0.001). Three patients had arteriovenous shunt in left arm for hemodialysis. Of remaining 52 patients, reflux was seen on IJV in 35 patients (67.3%). There were more patients with reflux flow seen on SS/TS (n=34) than on IPS (n=25).

Discussion: All the reflux flow was seen on the left side, which was concordant with previous reports.<sup>1-3</sup> Among the 52 patients included in analysis of reflux flow pattern, 35 patients (67%) showed type 1 with reflux flow on the IJV and dural sinuses (figure 1),

which support the previously suggested explanation; compressed or narrowed left brachiocephalic veins. Remaining 17 patients (33%) with venous reflux flow in dural sinus showed no reflux flow on the left IJV (type 2). Velocity of reflux flow in IJV might be slower than in dural sinuses, due to larger diameter of IJV, and could be slow enough to be under the in-slab saturation.<sup>4</sup>

Conclusion: Venous reflux flow on TOF MRA is infrequently observed, and reflux pattern is variable in IJV, IPS and SS/TS. Because it is exclusively located in the left side, the reflux signal on TOF MRA could be an alarm for undesirable candidate for contrast injection on left side for contrast enhanced imaging study and also venous blood sampling from IPS.

References:

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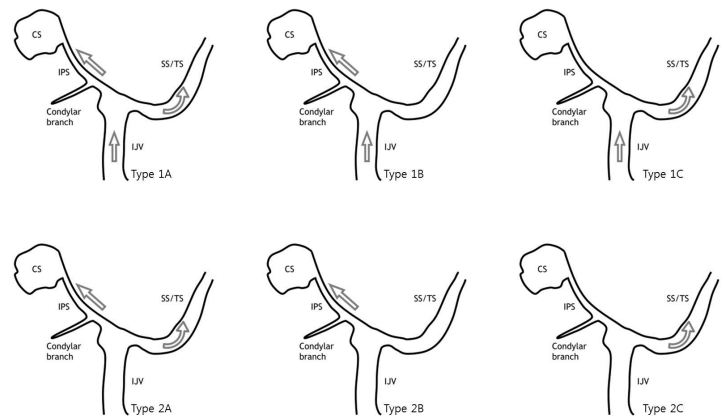


Figure 1. Reflux flow patterns in IJV, SS/TS, and IPS.