Prevalence and Clinical Significance of Unilateral Absent Flow in a Transverse Dural Sinus (TDS) on MR Venography

Jonathan Kim, Rafael Rojas, Yu-Ming Chang, Rafeeqe Bhadelia

The Problem
Unilateral absence of flow signal in a TDS is frequently observed on MR Venography (MRV). In the setting where MRV is performed in isolation without contrast enhanced sequences, the finding of unilateral absence of flow in a TDS presents diagnostic uncertainty as this may relate to either dural venous sinus thrombosis or slow flow.

Aim/Goal
Our purpose was to determine:
- Prevalence of unilateral absence of TDS flow signal on MRV;
- Its clinical significance by assessing thrombosis on contrast-enhanced MRI/CTV; and
- If asymmetry in TDS size explains the phenomenon of absent flow on MRV;

The Team
- Jonathan Kim, MD, Department of Radiology
- Rafael Rojas, MD, Department of Radiology, Neuroradiology
- Yu-Ming Chang, MD, Department of Radiology, Neuroradiology
- Rafeeqe Bhadelia, MD, Department of Radiology, Neuroradiology.

The Interventions
- 123 patients who had both MRV (2D Time-of-flight and/or 3D Phase-contrast) and gadolinium enhanced 3D-MPRAGE images or CT venography between January 2014 and October 2015 had their imaging reviewed.
- MRV imaging was reviewed to determine the number with unilateral complete absence of flow in a TDS.
- Those cases with unilateral absence of flow in a TDS were evaluated for present or absence of thrombosis on contrast enhanced MRI/CTV.
- Asymmetry in size between the lateral-most portion of the transverse sinuses were measured.
- T-test was performed to determine the correlation of TDS size asymmetry with absent flow on MRV.

The Results/Progress to Date
Of the 123 patients, 25 (20.3%) had absence of flow in one TDS on MRV. The absent TDS flow was seen on the left in 15 and on the right in 10 patients. Comparison with post-contrast images (116 MPRAGE; 7 CTV) showed 5/25 (20%) of patients with unilateral absence of TDS flow had signs of thrombosis on post-contrast images. Patients with absent TDS flow had significant asymmetry of size compared to those without (P<0.001).

Lessons Learned
- Unilateral absence of TDS flow is common on MRV examinations, and is a false positive finding in 80% of the patients.
- Size asymmetry appears to contribute to the phenomenon of absent unilateral TDS flow.
- Finding of unilateral absence of TDS flow may warrant additional imaging with contrast enhanced MRI or CTV in order to differentiate between thrombosis and slow flow, as these can appear identical on non-contrast MRV.

Next Steps/What Should Happen Next
- Implement a clinical practice protocol where further evaluation with either contrast enhanced MRI or CTV should be suggested in cases where unilateral absence of flow in a TDS is encountered.
- CTV becomes an important adjunct in those patient populations who cannot receive gadolinium, i.e., pregnant women.
- Education of the radiology residents and Neuroradiology section as well as clinicians in order to recognize this finding and the potential for false positive results.

For more information, contact:
Jonathan Kim, MD, Resident, jkim25@bidmc.harvard.edu