

Clinical and Radiographic Features of Transitional Venous Anomalies

Michael Zhang MD; Nicholas Telischak; Nancy Fischbein MD; Greg Zaharchuk; Michael P. Marks MD; Gary K. Steinberg MD PhD; Jeremy Heit MD PhD; Michael Iv Stanford School of Medicine, Department of Neurosurgery Stanford School of Medicine, Department of Radiology

Introduction

There is limited information about transitional venous anomalies (TVAs), lesions that resemble developmental venous anomalies (DVAs) on cross-sectional imaging but demonstrate early arteriovenous shunting without a parenchymal nidus, a feature that is characteristic of an AVM. We investigate the radiographic and clinical features of TVAs using arterial spin labeling (ASL)-MRI and recommend potential management.

Methods

We conducted a retrospective single -institution review of patients with DVA-like lesions on MRI but with increased ASL-signal from January 2010 to December 2016. Clinical histories and follow-up information were obtained. Location of abnormal ASL-signal with respect to the vascular lesion on MRI and, if available, the presence of arteriovenous shunting on DSA were assessed.



Figure. A 7-year-old girl presented with acute onset headache, nausea, and vomiting, who on arrival was thought to have improved such that anticipated embolization and external ventricular drain were held, and she was ultimately discharged on steroids for meningtic pain. (A) T1-weighted sequences showed a large developmental venous anomaly along the right parasagittal territory. (B) Additional ASL sequences localized shunting to the overlying drainage. (C) CT Head confirmed large acute intraventricular hemorrhage from a right parenchymal focus with blood in the bilateral lateral, third, and fourth ventricles (D) Subsequent DSA, as seen on anteroposterior view of the right internal carotid artery injection, identified early parenchymal filling. (Case 6)

Results

30 patients (mean age: 48.8 years, 57% male) were included. 29 patients had their initial MRI for symptoms unrelated to the TVA while the remaining patient for TVAassociated hemorrhage. Location of ASL-signal relative to the TVA on MRI was as follows: 17 (57%) in the parenchyma, 10 (33%) in the TVA, and six (20%) in a distal vein/sinus. Of seven patients who had DSA, five (71%) showed arteriovenous shunting, corresponding to ASLsignal in the parenchyma or distal vein/sinus on MRI. The remaining two patients without shunting on DSA had ASL-signal in the DVA itself. 10 patients had follow-up MRIs at a median of 18.7 months. All demonstrated unchanged ASLsignal except for two with decreased signal.

Conclusions

Abnormal ASL-signal in the parenchyma or distal vein/sinus associated with a DVA-like lesion likely represents arteriovenous shunting related to a TVA. Based on our series, TVAs are often incidentally detected in patients without symptoms or unrelated pathology and have a lower risk of hemorrhage than AVMs. Given their relatively benign clinical presentation, we believe that TVAs can be assessed and followed with

Learning Objectives

1.Understand the imaging features associated with a transitional venous anomaly.

2.Appreciate the natural history and role of MR imaging in the clinical work-up of transitional venous anomalies.

3.Consider the value of non-invasive assessment and monitoring of transitional venous anomalies in specific clinical settings.

References

PMID: 21161024, 25236477, 27399378