Leptomeningeal and Dural FLAIR Hyperintensities in the Evaluation of Cerebral Venous Thrombosis

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Purpose
The clinical and neuroradiologic manifestations of cerebral venous thrombosis (CVT) are remarkably diverse with a highly variable temporal profile. MR imaging interpretation emphasizes the identification of intraluminal thrombus based on the temporal correlation of evolving signal characteristics. Cortical vein thromboses and the relatively insidious manifestations of subacute or chronic thromboses may be particularly difficult to discern. MR imaging demonstration of venous hemodynamic perturbations and associated CSF abnormalities are addressed infrequently. We hypothesized that FLAIR sequences may reflect flow disturbances in dural venous structures and leptomeningeal hyperintensities attributable to venous stasis and associated CSF alterations.

Materials & Methods
Retrospective analysis of consecutive MR studies, including FLAIR sequences and phase contrast MRV, performed during a 3-year period for the evaluation of suspected CVT. Postoperative or postanesthesia studies, as well as cases with meningitis or subarachnoid hemorrhage were excluded as FLAIR hyperintensities have been described in these settings. Blinded review of FLAIR sequences was conducted with subsequent correlation with other MR sequences and conventional angiographic findings.

Results
Leptomeningeal or dural FLAIR hyperintensities were noted in 62/124 (50%) studies. Dural hyperintensities were observed in 49/124 (40%) studies, appearing as segmental hyperintensity of a venous sinus in 37/49 (76%) and partial hyperintensities along the perimeter in 12/49 (24%). Leptomeningeal hyperintensities were observed in 45/124 (36%), with focal prominence in 35/45 (78%). Coexistent leptomeningeal and dural findings were noted in 33/62 (53%), isolated leptomeningeal findings in 12/62 (19%) and isolated dural in 17/62 (27%). All cases of CVT diagnosed by MRV (n = 39) demonstrated dural FLAIR hyperintensities (p < 0.001), with coexistent leptomeningeal findings in 25/39 (64%). Based on MRV diagnosis of CVT, FLAIR hyperintensities have a sensitivity of 100% and specificity of 72%. Serial MR imaging in 12 subjects with CVT revealed resolution of leptomeningeal hyperintensities with persistence of dural abnormalities on follow-up imaging. All subjects with angiographic demonstration of CVT (n = 3) exhibited combined dural and leptomeningeal FLAIR hyperintensities.

Conclusion
Leptomeningeal and dural FLAIR hyperintensities may be seen in CVT, and likely represent venous stasis. Observation of these FLAIR abnormalities may complement the diagnostic interpretation of MR studies in the evaluation of suspected CVT.
References