Intracranial Infection: Appearance on Diffusion MR Imaging

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Purpose
Diffusion-weighted MR imaging (DWI) is valuable in assessment of acute cerebral infarction, and also has been described in cerebral abscess and encephalitis. We describe the DWI appearance of cystic infective lesions and noncystic lesions.

Materials & Methods
Twenty-five patients with clinical diagnosis of CNS infection from July 1999 to June 2000 were reviewed. Cystic lesions included cerebral abscess (n = 4), tuberculoma (n = 2), neurocysticercosis (n = 6) and subdural empyema (n = 4). The noncystic infective lesions were viral encephalitis (n = 5) and toxoplasmosis (n = 4). All patients underwent contrast-enhanced MR examination and DWI (single shot EPI b = 1000 s/mm²). Apparent diffusion coefficient (ADC) analysis was carried out using Functool (GE, Milwaukee, WI).

Results
Cerebral abscesses and tuberculomas were hyperintense on DWI and showed reduced ADC. Empyema collections were also hyperintense on DWI; with ADC values ranging from 0.602 to 1.030 x 10⁻³ mm²/s. All cystic lesions in neurocysticercosis were hypointense on DWI and showed elevated ADC (1.830 to 2.570 x 10⁻³ mm²/s). Four of five patients with encephalitis showed DWI hyperintensity and reduced ADC. Toxoplasmosis lesions were variable, some were hyperintense with low ADC, some were hyperintense with normal ADC, and others were isointense with normal or slightly elevated ADC.

Conclusion
Cerebral abscess, tuberculosis, empyemas, and encephalitis were hyperintense on DWI. Neurocysticercosis, on the other hand, were hypointense, and could be distinguished readily from other infective cystic lesions. The DWI appearances of cerebral toxoplasmosis did not show a distinct pattern and were more difficult to interpret.

References