

CNS Infection in the West: the Value of MRI

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Demyelination, degenerative disorders, and neoplastic disease are all more common in the CNS than infections, yet the prompt and accurate diagnosis of CNS infections is perhaps more important than any of these diseases because of the profound effect accurate diagnosis of infection has on patient treatment and outcome. Prompt institution of appropriate antibacterial and/or anti-viral therapy is critical. Magnetic resonance imaging is the single most important diagnostic test for parenchymal infections; CSF analysis remains the best test for the diagnosis of meningeal diseases. It is the purpose of this lecture to demonstrate the MRI manifestations of the most commonly encountered CNS infections in the adult in the “West”, as well as those of less common infections that have important patient management implications.

The examining physician rarely knows *a priori* the location or etiologic agent of a CNS infection, although patient demographics, past history and current clinical findings can provide excellent diagnostic clues. Fortunately, regardless of the suspected agent, a common MRI technique can be used for virtually all suspected infections. This technique differs little if at all from any standardized imaging protocol, although of course different radiologists may have preferences for one method over another. The standard imaging technique is to always include un-enhanced AND enhanced images, FLAIR, DWI, and a T2*-weighted sequence. MRS can be added if there is difficulty with the differential diagnosis of a focal lesion. MRA is occasionally useful. In combination, these sequences are highly sensitive in detecting infection in virtually any part of the CNS, and characterizing the disease. The lesion’s MRI signature so established, for example whether or not there is blood, restricted diffusion, susceptibility, or enhancement, as well as the spatial distributions of the abnormalities, leads to a surprisingly concise differential diagnosis. Final definitive diagnosis may require serology, CSF analysis and/or tissue sampling.

It is the purpose of this course to demonstrate the MRI signal intensity signatures, and spatial distribution patterns in the CNS, of 10-12 important infections, and discuss the differentiating features from other diseases. This shall include bacterial cerebritis and abscess, tuberculoma and tuberculous meningitis, various forms of viral encephalitis such as herpes simplex, herpes zoster, CMV and West Nile. For differential purposes the discussion will include comparisons to the most common parasitic diseases, especially cysticercosis and toxoplasmosis, and to unusual manifestations of neoplastic, demyelinating and metabolic diseases.