Central Nervous System Infections: A Clinical Review Article

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Infections of the central nervous system (CNS) can be categorized into 3 broad groups: meningitis, encephalitis, and brain abscesses. CNS infections require early intervention in order to prevent sequelae or death. The purpose of this project is to educate healthcare providers and students about the epidemiology, etiology, presentation, diagnosis, and management of CNS infections. The four etiologies discussed include: bacterial, viral, fungal, and parasitic organisms.

Meningitis, inflammation of the leptomeninges, is most commonly caused by a virus or bacteria. There are ~4,100 cases of bacterial meningitis per year in the US of which 12% are fatal. Patients typically present with fever, headache, neck stiffness, and altered mental status. Initial treatment involves empiric antibiotic therapy tailored to age and risk factors until cerebrospinal fluid cultures confirm the causative pathogen and antibiotic sensitivity.

Encephalitis, a progression of meningitis, is much less common and is typically due to infection by viral pathogens. It is distinguished from meningitis by the addition of inflammation of the brain parenchyma and the presence of focal neurologic deficits in more critically ill patients.

Brain abscess are less common and present with headache, seizure, focal neurological deficits, and altered mental status. These patients require hospitalization for treatment by surgical aspiration or excisions and antibiotic therapy. Parasitic and fungal infections, also less common, present with unique features and in special populations.

CNS infections are considered a medical emergency, so it is necessary that clinicians have a high degree of clinical suspicion in order to identify and manage them appropriately.