Encephalitis and Meningoencephalitis

Encephalitis is inflammation of the brain parenchyma. Meningoencephalitis is an inflammatory process involving both the brain and meninges.

Epidemiology

- The estimated annual incidence of encephalitis in the UK is 4/100,000.
- Infections are most frequent and severe in children and the elderly.
- Herpes simplex can cause a benign lymphocytic meningitis in adults, but usually produces a severe encephalitis in neonates. Infection in adults can also be very severe.
- Post-infectious encephalitis is the most common demyelinating condition and is most often seen in children, as it may complicate the common childhood exanthemas.

Aetiology

- Viral:
    - Acute viral encephalitis (caused by a direct viral infection of the brain):
        - HSV, herpes zoster, EBV, CMV, enteroviuses, adenoviruses, rabies, Japanese B encephalitis
    - Post-infectious encephalitis (also called acute disseminated encephalomyelitis) which is an autoimmune process, following a viral infection:
        - Influenza, measles, rubella, varicella, HIV
    - The most common cause in the UK is herpes simplex.
- HIV infection is of increasing importance; toxoplasmic meningoencephalitis was one of the first opportunistic infections to be described in HIV-infected patients.[1]
- Bacterial causes: tuberculosis, mycoplasma, listeria, Lyme disease, cat scratch fever, leptospira, brucella, legionella, neurosyphilis, all causes of bacterial meningitis.
- Rickettsial: Rocky Mountain spotted fever, endemic typhus, epidemic typhus, Q fever
- Fungal: cryptococcosis, coccidiomycosis, histoplasmosis, candidiasis.
- Parasitic: trypanosomiasis, toxoplasmosis, echinococcus, schistosomiasis, amoebiasis.

Presentation

- Encephalitis may begin with a flu-like illness or with a headache, followed by a rapid development of altered consciousness, with confusion, drowsiness, seizures and coma.
- Symptoms may also include symptoms of increased intracranial pressure such as severe headache, vertigo, nausea, convulsions and mental confusion. Other possible symptoms include photophobia, sensory changes and neck stiffness.
- Epilepsy, focal neurological signs and cognitive impairment may develop.
- Subacute sclerosing panencephalitis is a late complication of measles and presents four to ten years after the initial infection. Progression may be slow or rapid with personality change, dementia, seizures, ataxia and death. Progressive rubella panencephalitis is similar.

Differential diagnosis

- Meningitis
- Behcet's syndrome
- SLE
- Post-vaccine encephalomyelitis
- Stroke
- MS
- Syphilis
- Intracerebral tumour
- Leukaemia
- Lymphoma

Investigations

- LP: Similar to viral meningitis CSF. PCR for HSV, CMV, EBV, varicella, JE encephalitis.
- Bloods: FBC non-specific lymphocytosis, cultures, UEC, LFT, ESR and CRP.
- Other cultures, e.g. throat swabs and stool cultures, may be indicated.
- CT scan: Can help rule out DDx, ↑ICP, subtle changes in temporal lobe
- MRI scan: more sensitive
- EEG: More use than CT - Often abnormal (diffuse slowing with periodic discharges).

Management

- ABC
- Early antiviral: If HSV – **aciclovir** 10mg/kg q8h IV. If CMV: **ganciclovir** 5mg/kg bd IV
- If HIV+toxoplasmic meningoencephalitis: **Pyrimethamine** plus **sulfadiazine**, pyrimethamine plus clindamycin, or trimethoprim-sulfamethoxazole may help.
- Supportive care: careful fluids
- Treat Cx:
    - Seizures: anti-convulsants
    - Agitation: sedatives
    - Cerebral oedema: mannitol, ?dexamethasone, consider ventilation
- Acute disseminated encephalomyelitis is treated with high dose steroids, which may improve the outcome if started early enough.

Complications

- SIADH
- DIC
- Cardiac and respiratory arrest.
- Epilepsy.
- Broad range of potential neuropsychiatric impairments. Severe amnesic syndrome caused by profound damage to the temporal lobes may occur.
- Physical problems include mild balance, co-ordination and dexterity problems or major neurological problems with speech and swallowing problems and total dependency.

Prognosis

- The prognosis depends on the age of the patient and the underlying aetiology.
- The poorest prognosis for viral encephalitis occurs in patients with HSV encephalitis and subacute sclerosing panencephalitis.

Prevention

- Some encephalitides can be reliably prevented by vaccination, e.g. Japanese encephalitis and rabies.
- Vector control is the main method of prevention for some pathogens, e.g. arboviruses.