Measles Encephalitides

1. **Subacute measles encephalitis**

* pathogenesis - virus persistence in *immunosuppressed individuals* (mostly children).

1. **Postmeasles encephalomyelitis** - incidence 1 : 1000 (mostly older persons).

* pathogenesis - autoimmune.

1. **Subacute sclerosing panencephalitis (sspe)** - incidence 0,5-1 : 100,000 (85% are children 5-15 yrs).

* pathogenesis - *defective* virus persistence (slow-virus infection!)

Subacute Measles Encephalitis (s. Measles Inclusion Body Encephalitis, Progressive Infectious Measles Encephalitis)

* + occurs in *immunosuppressed individuals* after latent period of 1-10 months.
  + histology - intranuclear (sometimes intracytoplasmic) *eosinophilic inclusion bodies* (with measles virus antigen) in neurons and oligodendrocytes; minimal perivascular inflammation.

Clinical Features

* + 1. altered level of consciousness
    2. seizures (epilepsia partialis continua is prominent feature)
    3. multifocal neurological signs
    4. no fever
       - progressive deterioration to coma and death (in several weeks ÷ 5 months).

Diagnosis

* + - * **CSF** – as in viral encephalitis, but inflammation is minimal\* (in 1/3 cases CSF is entirely normal); **PCR** may be positive.
      * **EEG** - nonspecific slowing.

\*diagnosis can be confirmed only by **brain biopsy**.

Treatment

* + - * case reports of favorable use of ribavirin.

Postmeasles Encephalomyelitis

Autoimmune pathogenesis - perivenular demyelinating disease.

* no virus evidence in brain (i.e. no intracellular inclusions).

During convalescence from measles (i.e. within 2 weeks after rash onset) - sudden recurrence of fever with:

* 1. altered level of consciousness
  2. seizures
  3. multifocal neurological signs.

Mortality 20-40%; sequelae are common in survivors.

Subacute Sclerosing Panencephalitis (SSPE)

Synonyms: Dawson's encephalitis, subacute inclusion body encephalitis, subacute sclerosing leukoencephalitis, van Bogaert encephalitis.

Etiology

1. **primary measles infection** (usually at age < 2 years\*) →emergence of **defective**\*\* **measles virus** → **virus persistence** (virus particles are found in brain biopsy) – years after acute measles.
2. **after** **MMR** **vaccination** – incidence < 1 : 1000,000 (i.e. much less common).

\*when maternal antibody may still have been present

\*\*absent M protein - necessary for alignment of nucleocapsids under viral proteins in cell membrane so that budding of virus can take place; in SSPE there is no budding and no release of extracellular virus - *virus spread occurs by cell fusion*

Clinical Features

- insidious onset of gradual progressive psychoneurological dysfunction (no fever):

* 1. **Mental deterioration**, personality and behavioral changes
  2. **Seizures** (initially *myoclonic jerks*)
  3. **Motor abnormalities** (dystonia, rigidity, ataxia → rigid quadriplegia and vegetative state simulating decerebration)
  4. Ocular abnormalities
     + 100% progresses to coma and death within 1-10 years (džn. dėl pneumonijos).

Diagnosis

1. **EEG** – characteristic *periodic complexes* (on attenuated "flat" background): regular stereotyped bursts of *high-voltage slow* δ *waves* recurring at 3-20 second intervals (one-to-one relationship with clinical myoclonic jerks).

* early in disease, bursts may be confined to sleep (H: serial EEGs).

1. **CT** – generalized cortical atrophy (i.e. polioencephalitis), multifocal hypodense lesions in white matter (i.e. leukoencephalitis), ex vacuo ventricular enlargement.
2. **CSF** – acellular, protein content normal but globulins↑\* (> 20% of total CSF protein).

\*oligoclonal IgG bands representing measles virus-specific antibodies

1. **Measles Ab**↑ in serum, CSF

N.B. neaptinkama įprastinio Ak prieš measles M proteiną (nes M proteinas, reikalingas for virion assembly, yra defektinis – lemia viruso persistenciją).

1. Diagnosis confirmation (rarely needed) – **brain biopsy**:
   1. perivascular cuffing by lymphocytes (host’s immunity intact!) in white and gray matter.
   2. neuronophagia and widespread gliosis (in severe long-standing cases, brain may feel unduly hard – sclerosed!)
   3. intranuclear eosinophilic *inclusion bodies* of Cowdry type A (with abundant measles antigen) in oligodendrocytes and neurons.
   4. viral genome can be detected by **in situ hybridization** or **PCR**.

N.B. viral M (membrane) protein cannot be found in brain tissue!

* 1. virus is isolated by **co-culture with permissive cell lines**.

Treatment

- **supportive** (anticonvulsants, etc).

* reports of clinical improvement with IFN-α, isoprinosine (Inosiplex) 100 mg/kg/d.