Differential diagnose of cerebral infections

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Encephalitis

- Definition: Inflammation of the brain parachyma
- Markers: Inflammatory cells of CNS
  MRI
- Aetiology: 1) Infectious agents (15-50% identifiable)
  2) Other inflammatory pathology (post infections/immune mediated/parainfections).
- Pathology: Overlap:
  Viral encephalitis is a mixture of viral cytopathology and postinfectious inflammatory response (eg vasculitic component)
- Incidence: 3/100.000 children
  (0,4/100.000 ADEM)

Children often have fever unspecified !!

- **Encephalopathy**
- Definition:
  - Behavioral change
    E.g.: Confusion, excessive irritability
  - Alteration in consciousness
    e.g.: lethar gy, coma
    with or without: Seizures, ataxia, focal motor deficits, vomiting, fever etc.

DESCRIBITIVE TERM – NOT A DIAGNOSE

- Aetiology:
  1) Infectious agents
  2) Other inflammatory pathology
  3) Other: Seizure, metabolic, toxic etc.

Differential diagnosis

- Parainfections/postinfectious
  - ADEM
  - ADANE
- Autoimmune
  - NMDA receptor
  - VGPA receptor
  - Hashimoto
- Seizure related
  - Non-convulsive status epilepticus
  - Post ictal
  - Complex FC

Trauma
Non-accidental

Differentiel diagnose continued

- **Toxins**
  - Drugs
  - Carbon monoxide

- **Metabolic**
  - Diabetic ketoacidose
  - Uraemia
  - Hepatic encephalopathy,
  - Hypoglycaemia
  - Mitochondrial disorder
  - Etc.

Other

Vasculitis/angiitis

Venous sinus tromboses and infarction

Hypertensive crises

Ischaemic cerbrovascular disorder

Functional disorder

Clinical assesment

1. **ABC**
2. History:
   a) Early development, epilepsy
   b) Change in consciousness?
      (always believe parents)
   c) Timing of deterioration
   d) Trauma (also minor carotid dissection)
   e) Recent infection/vaccination
   f) Social
   g) Travel

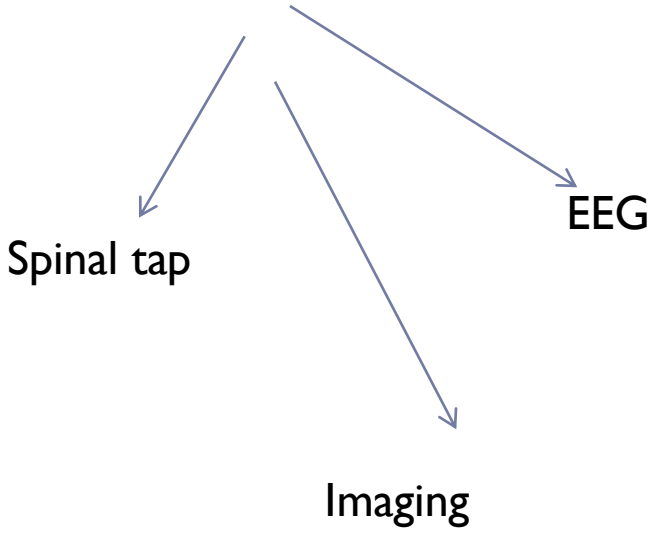
3. **Examination:**

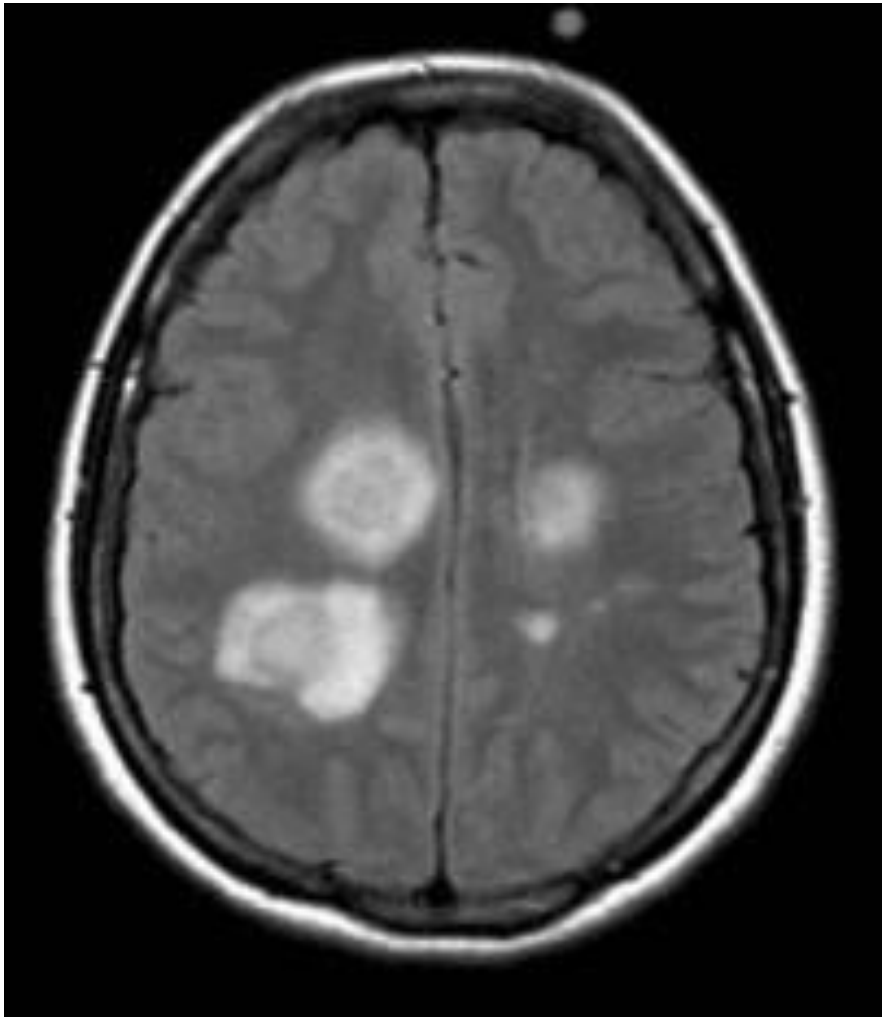
   Difficult: Observe and describe:

   1. Communication
   2. Visual alertness
   3. Pattern of movements
   4. Memory
   5. Neurological - if possible

Initial investigations in encephalopathy

- Capillary glucose
- Blood gas
- Urea and eletrolyts
- Liver function tests
- Amonia
- Full blood count
- Plasma to save
- Urine dipstick
- Urine to save





ADEM = acute demyelinating encephalomyelitis

- Def.:
  1. Acute or subacute onset
  2. Polysymptomatic
  3. Encephalopathy
  4. MR: Focal or multifocal
     T2 hyperintensive lesions
     WM, basal ganglia
     thalamus
  5. Event is followed by improvement
  6. No other aetiology

- Lab.
  1. Elevated CSF protein
  2. Elevated WBC (20-50/min)
  3. Oligoclonal bands (30%)

ADEM (cont)

- Preceding infection/vaccination 70%
- Mean age 7 (0,4-16)
- Clinical course: Progressive over 1-4 days

Clinical:

1. Encephalopathy 100%
2. Pyramidal signs 70%
3. Ataxia 40%
4. Craniel nerve palsy 30%
5. Visuel loss 15%
6. Seizures 15%

- Triggers (2-21 days): Influenza
  Entero
  Varicella
  Mycoplasma
  vaccination
- Treatment: Immunosuppressive
  Drug and Doses: Evidence free zone

Case

- 15 year old boy
- Clinical: For 1 month somewhat depressive then:
  GTC lasting 5-45 minutes
  Encephalopathic
  MR: Normal
  CSF: 30 WBC.
  Low grade feber
  Neg. Work-up otherwise
- Diagnose?

- Lab. : Pos. Antibody to NMDR in blood and CSF
  (N-Methyl-D-asparate receptor)

- Follow up: Dystonic after 1 week
  Treated with IgG, steroids,
  cyclophosfamide, rituximab.
  Referred to rehabilitation
  12 months later severely mental R
  MR: General atrophy

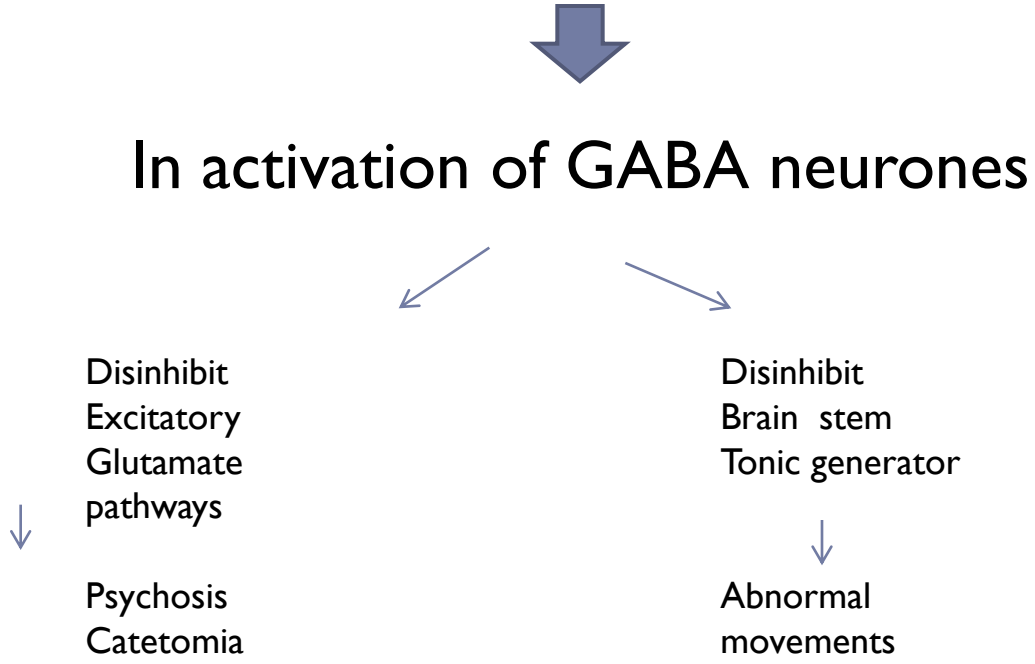
Autoimmune synaptic encephalitis

- Clinic
  1. Psychiatric symptoms (not always)
     (Hyperactivity, irritability ,catatonic
     Days – weeks ⟶
  2. Movement disorders (80%)
     Orofascial dyskinesia, kissing , fish/rabbit like movements, piano play movements
  3. Speech disturbance
     (language disintegration, eccolali, mutism
  4. Seizures (mimic 2)
  5. Autonomic dysfunctions, hypoventilation

- Lab.:
  - CSF: Pleocytoses <200 (85%)
    IgG index raised (often)
    Oligoclonal bands (often)
    Anti NMDA
  - Blood Anti NMDA (lower titer)
  - Tumour 30% of < 18 years old have ovarian teratoma
  - Treatment Steroids,IViG,plasma exchange,Rituximab

Pathogenesis

- Blockade of NMDAReceptor



- **Panayiotopoulos Syndrome**
- **Benign childhood epilepsy with occipital paroxysms (BCEOP)**

- Clinical manifestations

- 1) Vomiting initial event 80 %
- 2) Tonic eye deviation 80%
- 3) Autonome symptoms –pallor,hypersalvation,perioral cyonosis,urine incontinens-vomit
- 4) Impairment of consciousness 100%
- 5) hemiconvultions/sec TCS 40 %
- 6) complex partial status 40 %
- 7) Nocturnal 90%

- EEG:
- Normal bagground,25% normal at first exam. Multifocal sharp waves often occipital,fixation off sensivity,not photosensitive,not increased during sleep

- Diagnostic criteria

- 1) normal development
- 2) normal neuroimmaging
- 3)onset 2-12 years (4-6)
- 4)infrequent seizures vomiting and eye deviation with or without sec gen
- 5)multifocal EEG
- 6)Remission by age 12

- **Neuropsychology**

- Few studies - verbal tasks impaired ?
- better than BECTS ?

- Differential diagnosis:

- 1) Cerebral insult
- 2) encephalitis
- 3) Atypical migraine
- 4) gastroenteritis

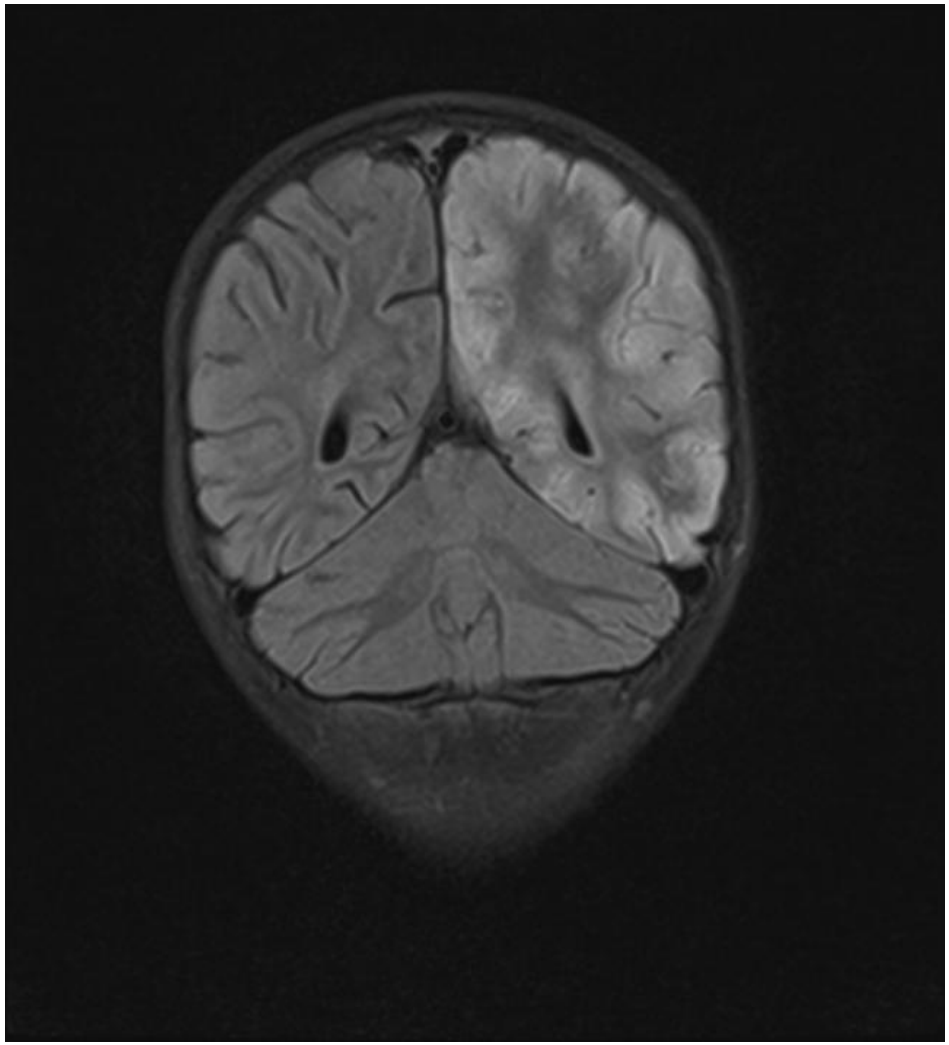
- **Prognosis**

- 30 % one seizure only
- 50% 2-5 seizures
- 5 % >10 seizures
- 20 develop other seizures

- Management
- guidelines like febrile convulsions
- OXC/LTG worsening seen

Case 3

- 3 year old girl, diagnosed with adrenogenital syndrome
  - well controlled
- Clinic: Fever → FSE → encephalopathy → unilateral focal seizures
- Lab.: Blood culture of Streptococcus pneumonica
  CSF x 2: Normal
- CT scan day 3: Uncertain hypointensity
- Treatment: Intensive AED – high doses of Midazolam



Hemiconvulsion – hemiplegia – epilepsy syndrome

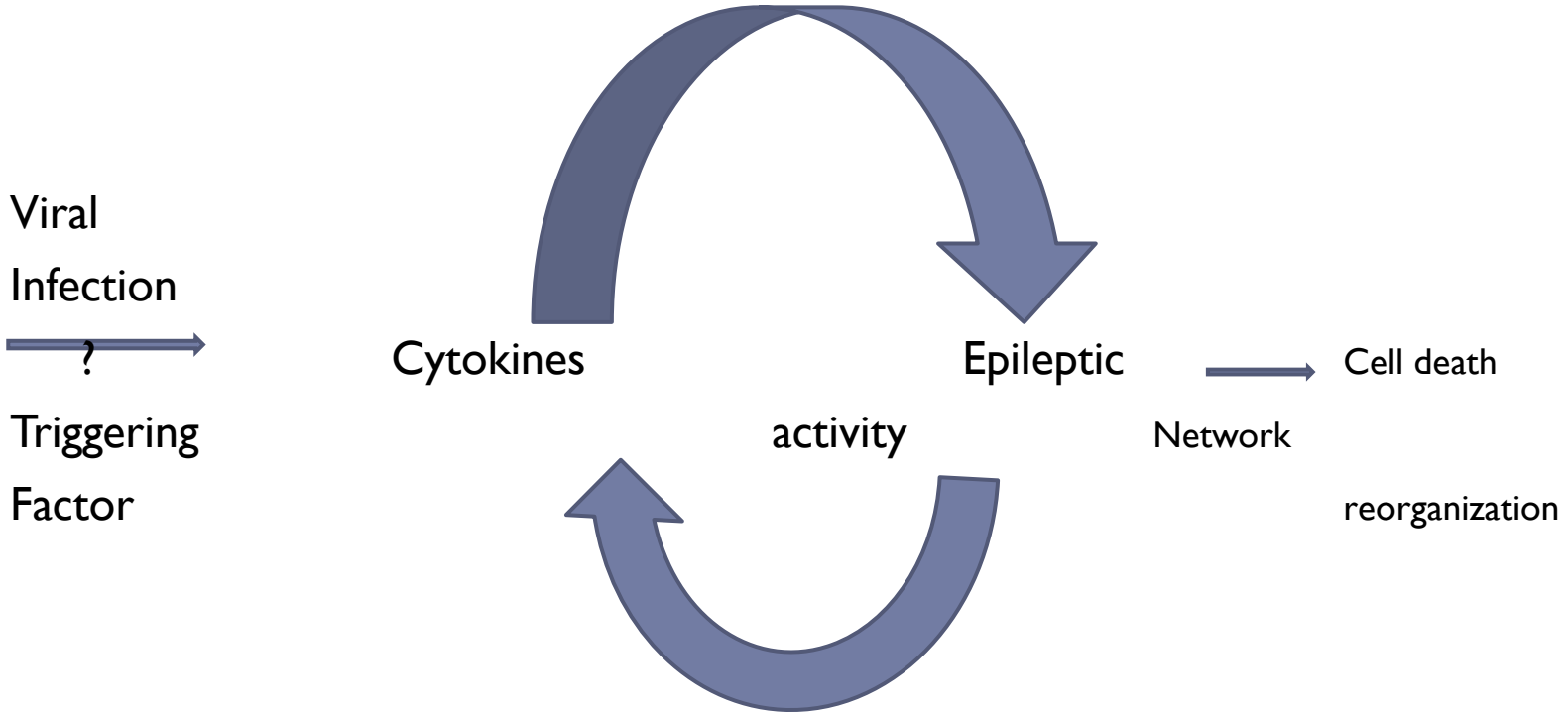
- Definition: Prolonged focal febrile convulsions with unilateral hemispheric edematosis.
  Swelling followed by atrophy and epilepsy

- Age 3 months – 4 years

- Clinical
  1. Febrile unilateral seizures
  2. Febrile status epilepticus
  3. Encephalopathy
  4. MR changes unilateral
  5. Hemiplegia
  6. Epilepsy in 80%

Lab.: Normal CSF
No signs of inflammation (including brain tissue)

A possible mechanism for HH syndrome ?



CASE

- 11 year old boy:
  ill with vomiting one week before admission.

  Presented with GTC followed by recurrent focal seizures and encephalopatic status epilepticus – sedation and intubation

CSF: 11 cells

MRI+CT: Normal

Refractory SE for 5 weeks

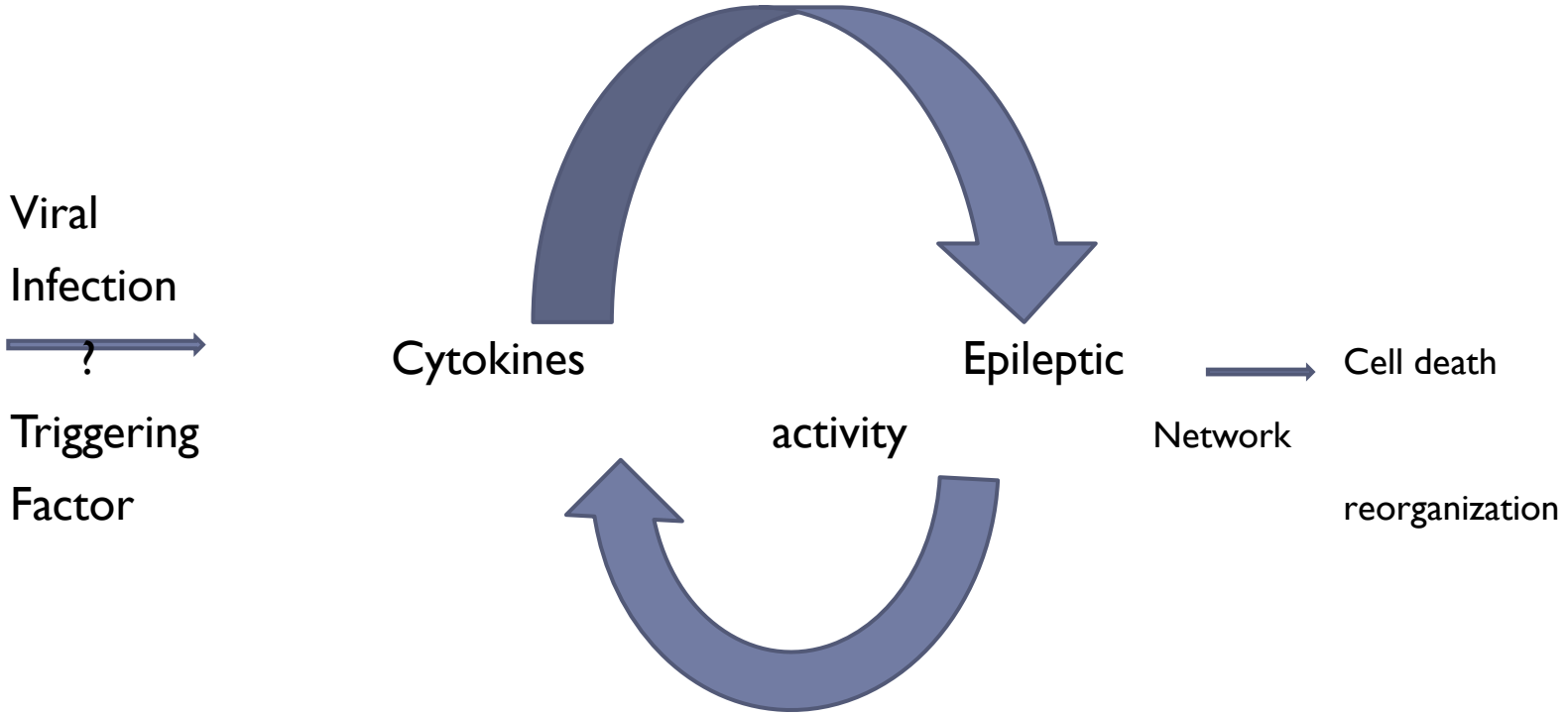
KD effective

Diagnose?

Fever induced refractory epileptic encephalopathy in school age children (FIRES)

- Clinical: 1-20 days after infection encephalopathy multifocal seizures
  Refractory status epilepticus for days-weeks
- Age: 5-15 years
- Prognosis: Cognitive deterioration
  Epilepsy
- CSF: Minimal pleocytosis or normal
  No oligoclonal bands
- MR: Normal (atrophy)
- Treatment Steroid disappointing
- Ketogenic diet?

A possible mechanism for HH syndrome and for FIRES



Callosal maturation permits bilateral involvement

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End of lectures !

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