

Central Nervous System Infections

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Questions

- Clinical features of CNS infections
- Aseptic meningitis and encephalitis
- Septic meningitis
- Therapy of septic meningitis
- Cerebrospinal fluid examination
- Differential diagnosis of CNS infections

Clinical features of CNS infections

- 1) General signs of infection
- 2) Meningeal irritation
- 3) Neurological involvement
- 4) Dermatological features
- 5) Signs of raised ICP

Signs and symptoms of CNS infections

General: fever, chills, malaise, nausea, restlessness, photophobia

Meningeal triad: fever, headache, vomiting

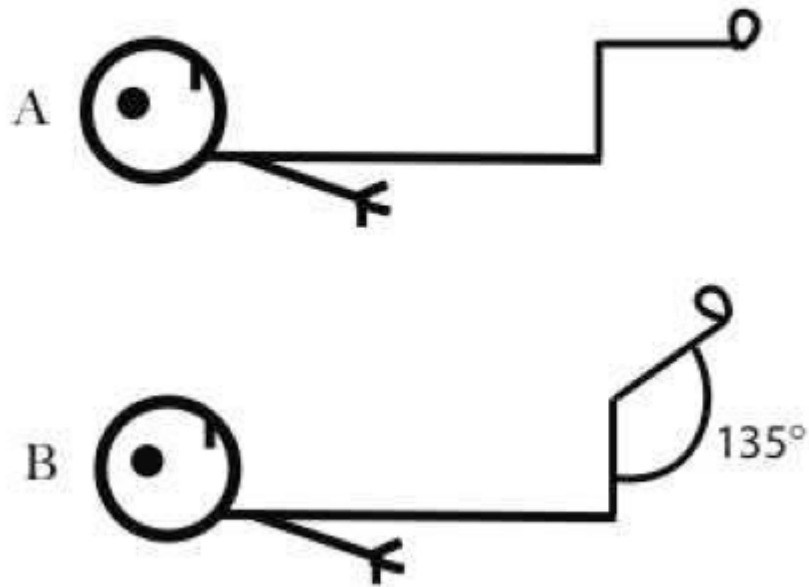
Neurological features: neck stiffness, nuchal rigidity, irritability, back pain, stupor, coma, seizures or focal neurological signs

Neurological signs

- Kernig's sign

is elicited with the patient in the supine position, in which the thigh is flexed on the abdomen with the knee flexed. The leg is passively extended, and, in the presence of meningeal inflammation, the patient resists leg extension

Kernig's sign

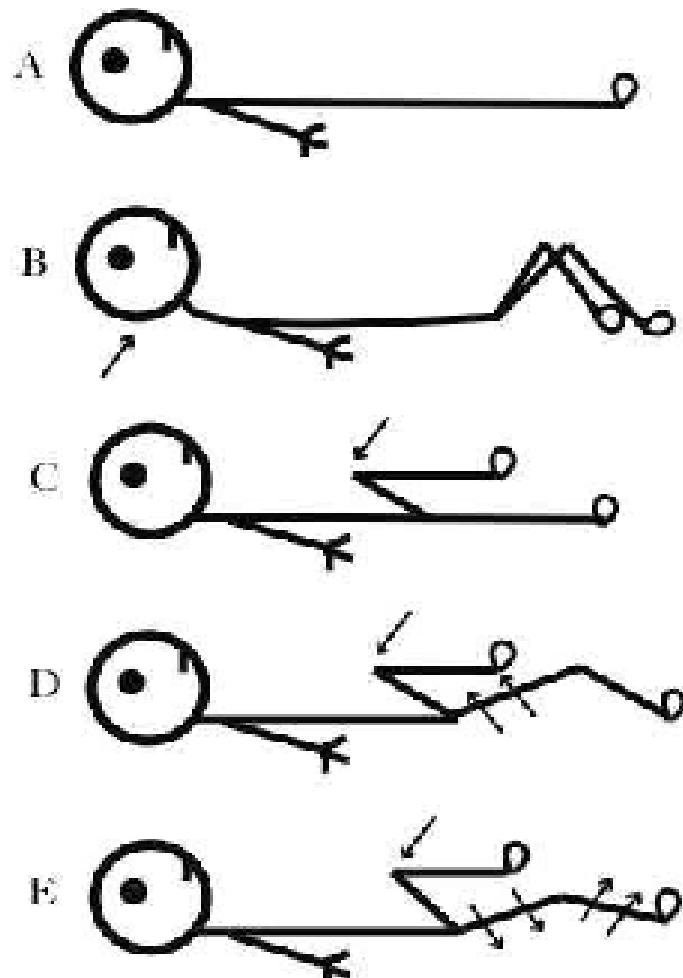


Neurological signs

- Brudzinski's sign

the best known is the nape-of-the-neck sign, in which passive flexion of the neck results in flexion of the hips and knees

Brudzinksi's sign



Amoss' sign

- *In painful flexion of the spine, inability to sit without supporting the arms behind the torso = („tripod position“)*
- Patients (children !!!) spontaneously assume the tripod-like position

Dermatological features

- Maculopapular rash
- Petechial rash
- Purpura
- Dermographism



















Signs in newborns and infants

- Bulging fontanelle
- Opisthotonus = *powerfull contraction of the back and neck mucsles causing the body to arch backwards so that the heels approximate to the head*

Signs in newborns and neonates

- Lethargy
- Refusal to feed
- Weak suck
- Vomiting
- Irritability
- High-pitched crying
- Temperature instability
- Jaundice

Signs of raised intracranial pressure

- Bulging fontanelle
- Papilloedema
- Bradycardia
- Hypertension
- Altered state of consciousness

Neurological involvement

- Meningitis
 - Encephalitis
 - Myelitis
-
- Acute
 - Peracute
 - Chronic

Meningitis x Encephalitis

- Fever
 - Headache
 - Vomiting
 - Meningeal signs
 - **Less frequent:**
 - Somnolence to coma
 - Focal neurologic signs
 - Seizures
- Fever
 - Headache
 - Depressed mental status
 - Focal neurologic signs
 - Seizures (focal or generalized)

Clinical features (encephalitis)

- Frontotemporal signs: memory impairment, aphasia, personality changes (HSV, HHV6, limbic autoimmune encephalitis)
- Rigidity, rest tremor (flaviviral)
- Seizures (involvement of cortex): HSV
- Brain stem involvement (HSV, ENT 71, WNV)
- Cerebellitis (VZV, EBV, mumps)

Neurological involvement

- **Diffuse:**
 - Meningitis
 - Encephalitis
- **Localized:**
 - Brain absces
 - Subdural, epidural absces

Focal CNS syndromes

- **Clinical presentation depends on:**
- the route of spread of the infection
hematogenous x direct (trauma)
- location of the lesion
*focal neurologic finding: stroke syndrome,
pareses to complete paralysis*
- severity of increased intracranial pressure

Differential diagnosis

- **Other infectious syndromes:**
- Parameningeal foci or infection (brain abscess, sinusitis, otitis, mastoiditis, subdural or epidural abscess, venous sinus thrombophlebitis, cranial osteomyelitis)
- Infective endocarditis
- Viral postinfectious syndrome
- Postvaccination (mumps, measles, polio, pertussis, rabies, vaccinia)

Differential diagnosis

- **Meningism** = triad of nuchal rigidity, headache and vomiting → irritation of meninges
- „**Meningismus**“ = symptoms are present without actual inflammation of CNS
- (other acute illnesses in paediatric population: viral or bacterial, febrile status)

Postinfectious meningitis

- Neurologic involvement develops one to three weeks after the illness (measles, rubella)
- Destructive CNS inflammation is caused by autoimmune mechanism similar to postvaccination involvement.

Noninfectious diseases

- Intracranial tumors
- Medications (ATB, cytosine, azathioprine, phenazopyridin, immune globulin)
- Systemic illnesses (lupus erythematosus)
- Procedure-related (postneurosurgery, intrathecal injections, spinal anesthesia)
- Miscellaneous (seizures, migraine or migraine-like syndromes)