Case Presentation

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Discussion

1. MANAGEMENT OF STATUS EPILEPTICUS.
2. DIFFERENTIAL DIAGNOSIS OF STATUS EPILEPTICUS.
3. ANALYSIS OF LUMBAR PUNCTURE.
4. ANTIBIOTICS FOR MENINGITIS.

Management of status epilepticus

Emergency Department Care

- Secure airway appropriately
- Oxygen supplementation
- Large-bore intravenous line
- Fluid resuscitation with crystalloid solution
- Cardiac monitor
- Bedside glucose testing with supplementation if needed

- **Thiamine** administration (100 mg IV) to treat or prevent Wernicke encephalopathy
- Sedation with **benzodiazepines**
- Check electrolytes, replace as needed
- Physical restraints often needed to ensure patient and staff safety (use in conjunction with chemical restraints)

Differential diagnosis of status epilepticus

Differential diagnosis of status epilepticus

CNS	Metabolic
• Stroke, Hemorrhagic • Stroke, Ischemic • Epidural Hematoma • Subarachnoid Hemorrhage	• Hypoglycemia • Hyponatremia • Hypothyroidism and Myxedema Coma • HHS • Hypertensive Emergencies

Differential diagnosis of status epilepticus

Infection	Other
• Encephalitis • Epidural and Subdural Infections • Herpes Simplex Encephalitis • Meningitis	• Delirium Tremens • Delirium, Dementia, and Amnesia • Heat Exhaustion and Heatstroke • Withdrawal Syndromes

Differential diagnosis of status epilepticus

Toxicity
• Anticholinergic • Antidepressant • Carbon Monoxide • Cocaine • Cyanide • Cyclic Antidepressants • Isoniazid • Medication-Induced Dystonic Reactions

Workup for differential diagnosis

1. LABORATORY STUDY
2. IMAGE STUDY
3. PROCEDURE:
   --LUMBAR PUNCTURE: CONSIDER TO RULE OUT ENCEPHALITIS/MENINGITIS.

Laboratory study

- Na/K/Cl/HCO3
- BUN/Cr
- Glucose
- Mg/P
- Liver function tests
- CPK (Some patients develop rhabdomyolysis.)
- Lipase
- Ketones
- Urinalysis
- Blood cultures
- Serum ethanol concentration – This is important because patients who exhibit withdrawal while ethanol is still present in the serum are likely to have a more severe course.
- Complete blood count with differential

Image study

- Chest radiography
  - About 50% of patients with delirium tremens who present with fever will have an infection; pneumonia being most common.
  - A chest radiograph should be obtained in all patients suspected of having delirium tremens.
- Obtain cervical spine radiographs if any question or suspicion of trauma or head injury exists.

Image study

- CT scanning of the head is performed selectively. Indications for a head CT scan include the following:
  - New-onset seizure
  - Seizures occurring over longer than a 6-hour period
  - More than 6 seizures
  - Focal seizures
  - Evidence of head trauma
  - Focal neurologic deficits
  - A prolonged postictal state
  - Deteriorating level of consciousness or failure to improve in level of consciousness over time

Analysis of lumbar puncture

Increased CSF pressure

- Congestive heart failure
- Cerebral edema
- Subarachnoid hemorrhage
- Hypo-osmolality resulting from hemodialysis
- Meningeal inflammation
- Purulent meningitis
- Tuberculous meningitis
- Hydrocephalus
- Pseudotumor cerebri

Decreased CSF pressure

- Complete subarachnoid blockage
- Leakage of spinal fluid
- Severe dehydration
- Hyperosmolality
- Circulatory collapse

Significant changes in pressure during the procedure

- Tumors
- Spinal blockage
- Hydrocephalus associated with large volumes of CSF

Pleocytosis

- Presence of WBC→ pleocytosis.
- Small number of monocytes → normal
- Presence of granulocytes → abnormal.
- Large number of granulocytes → bacterial meningitis.
- WBC can also indicate reaction to repeated lumbar punctures, CNS hemorrhage, leukemia, recent epileptic seizure, or a metastatic tumor.

Glucose level of CSF

- Glucose level is usually about 60% that in the peripheral circulation.
- Decreased glucose levels can indicate fungal, tuberculous or pyogenic infections; lymphomas; leukemia spreading to the meninges; meningoencephalitic mumps; or hypoglycemia.
- A glucose level of less than one third of blood glucose levels in association with low CSF lactate levels is typical in hereditary CSF glucose transporter deficiency also known as De Vivo disease.

Increased levels of lactate

- Presence of cancer of the CNS
- Multiple sclerosis
- Heritable mitochondrial disease
- Low blood pressure
- Low serum phosphorus
- Respiratory alkalosis
- Idiopathic seizures
- Traumatic brain injury
- Cerebral ischemia
- Brain abscess
- Hydrocephalus
- Hypocapnia
- Bacterial meningitis.

Changes in total protein

- Pathologically increased permeability of the blood-cerebrospinal fluid barrier
- Obstructions of CSF circulation
- Meningitis
- Neurosyphilis
- Brain abscesses
- Subarachnoid hemorrhage
- Polio
- Collagen disease or Guillain-Barré syndrome,
- Leakage of CSF
- Increases in intracranial pressure or hyperthyroidism.
- Very high levels of protein may indicate tuberculous meningitis or spinal block.

Antibiotics for meningitis

Empiric therapy (Age < 50 years)

Common pathogens

S. pneumoniae.

N. meningitidis.

H. influenzae.

Listeria (rare).

- **Cefotaxime** 2 grams IVPB q4h or **Ceftriaxone** 2 grams IVPB q12h) + **dexamethasone** (0.4mg/kg q12h x 2 days given 30 minutes prior to antibiotics)
- **Vancomycin** 1 gram IVPB q12h (may need higher doses).
- May also add **Rifampin** 600mg po qd or 300mg po bid.

If severe penicillin allergy:

- **Chloramphenicol** 1g IV q6h + **Vancomycin** +/- **Rifampin**.

Age > 50 years or alcoholism or other debilitating disease.

Common pathogens

S. pneumoniae.

Listeria.

GNB.

- **Ampicillin** 2 grams IVPB q4h + [**Ceftriaxone** 2 grams IVPB q12h or **Cefotaxime** 2 grams IVPB q4-6h] + **dexamethasone**.
- **Ampicillin** 2g IV q4h + **vancomycin** 1g IV q12h **plus** either [**Cefotaxime** 2g IV q4-6h or **Ceftriaxone** 2g IV q12-24h

If severe penicillin allergy:

- **Vancomycin** 1 gram IVPB q12h + **Bactrim** 15-20 mg/kg/day in 4 divided doses pending culture results. or
- [**Chloramphenicol** 1g IV q6h + **vancomycin +/- rifampin** 300mg PO or IV bid]

Trauma or post neurosurgery

Common pathogens

S. pneumoniae.

S. aureus.

P. aeruginosa.

Enterobacteriaceae.

- **Vancomycin** 1 gram IVPB q6-12h + **Ceftazidime** 2 grams IVPB q8h. // If gram negative bacilli are suspected add Gentamycin IVPB +/- intrathecally.

Impaired cellular immunity

Common pathogens

Listeria.

GNB.

- **Ampicillin** 2 grams IVPB q4h + **Ceftazidime** 2 grams IVPB q8h.

If severe penicillin allergy:

- **Bactrim** 15-20mg/kg/day in 4 divided doses.
- May add **Gentamicin**.

If Listeria present:

- cephalosporins are not effective.

N.meningitidis confirmed

- **Penicillin G** 4 million units IVPB q4h.

If severe penicillin allergy:

- **Chloramphenicol** 4 to 6 grams/day in 4 divided doses.

THANKS FOR ATTENTION