Neurological Emergencies

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ATLAS NEUROLOGY
GREAT FALLS
Alteration in Consciousness
Consciousness

- **Arousal**
  - primitive set of responses
  - depends on structures located in the brainstem. ARAS

- **Awareness**
  - high level integration of multiple sensory inputs.
  - Resides into the cerebral cortex.
Vegetative state

- Bilateral diffuse cerebral cortex failure.
- Intact arousal mechanism.
- Most commonly results from diffuse anoxic or ischemic injury.
Brainstem failure

- Impaired arousal mechanisms.
Diagnosis of Consciousness Alterations

- History is important:
  - trauma
  - illnesses
  - medications
  - drugs, alcohol.
  - Psychiatric disorders.
Physical exam

• General:
  o vital signs
  o skin (trauma, needle marks, etc)
  o head (trauma)
  o neck stiffness (attention in trauma)
  o chest, abdomen, heart, extremities
  o breath (liver dysfunction, alcohol, uremia, ketoacidosis in diabetes)
Neurological exam

- **Observation of patient**
  - position
  - spontaneous motions
  - open eyelids and/or hanging jaw = extremely deep coma.
Neurological exam

- Level of consciousness (from mild to severe)
  - confusion, delirium
  - drowsiness
  - stupor
  - light coma
  - deep coma
Neurological exam

- Position of head and eyes
  - deviations of the head and eyes
  - spontaneous rowing eye movements
- Funduscropy exam
- Pupils (reactivity to light, asymmetry)
- Doll’s eyes test
- Ice water caloric
Coma etiology

- Non convulsive status epilepticus
- Trauma
- Vascular diseases
- Infectious
- Neoplasms
- Systemic causes
  - metabolic
  - hypoxic
  - toxic
Laboratory Tests

- Routine tests
- Toxins screen
- MRI or CT scan
- Spinal Tap
- EEG
- Angiography
Infections
Infections

- **Meningitis**
  - Viral
  - Bacterial
  - Fungus

- **Encephalitis**
  - Viral
  - Bacterial
    - Usually abscess
Clinical Presentation

- Fever
- Headache
- Stiff neck
- Change in the level of consciousness
- Seizures
- History of immunosuppression, head trauma, sickle cell anemia, local infections.
- Type of bacteria depending on age and immune status
Diagnosis

- Spinal tap is the most important tool.
- A CT scan of head should be performed.
- PT, PTT and thrombocyte count.
- Informed consent.
CSF Studies

- **Tube 1**
  - glucose (get a fingerstick BS too)
  - protein

- **Tube 2**
  - Cultures
    - bacterial
    - PCR meningitis panel
    - AFB,
    - fungus cultures
CSF Studies cont.

- Tube 3
  - cell count with differential
- Tube 4
  - cytology if needed
- Remember to order to hold the remaining CSF
Prognosis

- Depends on the offending agent
- Depends on the age of patient
- Depends on the Immune system status
Treatment

- Initial treatment is empirical based on the age and other contributory factors.
- When CSF data is available then modify the treatment accordingly.
Status Epilepticus
Status Epilepticus

- Definition
  - generalized seizures lasting more than 30 minutes or repeated seizures without regain of consciousness between the seizures for 30 minutes.
Status Epilepticus

- Can occur in new onset seizure disorder
- Patient known with seizure disorder who stop suddenly the medications
- Alcohol withdrawn
- Drug abuse (cocaine, amphetamines)
- CNS infections (especially herpes encephalitis)
Treatment

- Start Lorazepam 1-4 mg iv.
- Prepare and start Fosphenytoin (Cerebrix) 20 mg PE/Kg IV at a rate of up to 50mg PE/min.
- If seizures not stopped then give IV 10 more milligrams PE/Kg
- If seizures not stopped then Keppra 1g IV.
- If seizures not stopped then Phenobarbital IV 20 mg/Kg (attention to the BP)
- If seizures not stopped then intubate and start barbituric coma under EEG monitoring.
Treatment

- After the seizures stopped do further diagnosis tests to clarify the etiology of the event.
- If possible treat the etiology of the status epilepticus.
Stroke
Stroke

- Ischemic about 90%
  - Anterior circulation about 80%
  - Posterior circulation about 20%
- Hemorrhagic about 10%
TPA protocol for ischemic stroke

- **Inclusion criteria:**
  - age 18 or older
  - time of onset less than 4.5 hours
  - clear stroke presentation
    - significant weakness
    - significant speech difficulty (aphasia)
    - substantial visual deficit
    - patient awake or drowsy
TPA protocol for ischemic stroke

- **Exclusion criteria:**
  - history of stroke in the previous 3 months
  - history of intracranial hemorrhage ever
  - serious head trauma in the previous 3 months
  - history of GI or urinary bleeding in the previous 21 days
  - major surgery in the previous 14 days
  - lumbar puncture in the previous 7 days
TPA protocol for ischemic stroke

Exclusion criteria: (cont.)
- arterial puncture in a non-compressible site
- pregnancy, lactation, or parturition within previous 30 days
- coma
- minor stroke symptoms
- major stroke symptoms improving rapidly
- clinical presentation of arachnoid hemorrhage with normal CT examination
Exclusion criteria: (cont.)
- SPB >185 or DBP >110 at the time of treatment
- associated serious medical or terminal illness
- seizure at stroke onset
- acute MI or pericarditis at stroke onset
- platelet count < 100,000
- PT INR >1.7; PTT >37; blood sugar <50 or >400
- hemorrhagic stroke by CT
- in the case of early signs of stroke by CT TPA should be avoided
TPA protocol for ischemic stroke

- Laboratory orders:
  - STAT
    - CBC, platelet count, PT, PTT, blood sugar, renal panel
    - CT of the head
    - EKG
- review lab results and review inclusion/exclusion criteria
- treat SPB > 185 or DBP > 110 with Labetalol 1- mg IV (over 2 min.) can be repeated once after 10 minutes
TPA protocol for ischemic stroke

- Vital signs and neuro checks q 15 min.
- give TPA dose if less than 4.5 hours from stroke onset
- TPA dose:
  - 0.9 mg/kg; maximum dose 90 mg regardless of the patient weight.
  - 10% is given in bolus over 1 minute and the remaining 90% infused over 60 minutes)
Mechanical Thrombectomy

- Major advancement in stroke care
- We have robust data and indications for the anterior circulation large vessels occlusion
- Obtain CTA after TPA is administrated
- Obtain CTA if there are contraindications to the TPA and the time of onset is less than 24 hours
- Perfusion/diffusion mismatch
Myasthenia Gravis
Myasthenia Gravis

- Autoimmune disorder were antibodies are directed toward neuromuscular junction acetylcholine receptors.

- Basic treatment consists in:
  - Anticholinesterase drugs
  - drugs that induce immunosuppression
Myasthenic crisis

- Changes in the absorption of medication or the natural worsening of the disease may cause increased weakness
- Anticholinesterase medication have a bell-shaped dose-response curve and too much medication can induce weakness
### Myasthenic crisis

Medications that can worsen the neuromuscular junction transmission

- Quinine
- Quinidine
- Procainamide
- Propranolol
- Lidocaine
- Aminoglycoside
- Quinolones

- Polymixin
- Viomycin
- Colistin
- Morphine
- Barbiturates
- Sedatives
- Magnesium supplements
Myasthenic crisis

- **Treatment**
  - admit into intensive care unit for monitoring
  - monitor respiratory function and not the pulse oximetry
  - intubate electively if decrease in respiratory function or in difficulties in protecting the airways
  - plasmapheresis or IVIG can be used for the treatment
Myasthenic crisis

- If patient is intubated you can decrease the anticholinesterase drugs to see if the weakness is due to overdose
- If patient is on oral pyridostigmine (Mestinon) and you want to give it IV the ratio oral/IV is 30/1 mg
Guillain Barré Syndrome
Guillain Bare Syndrome

- Autoimmune disorder
- Antibodies directed toward peripheral nerves myelin sheets
- Usually occurs a couple of weeks after a viral illness
- Patient has progressive weakness that starts distally
- It may involve respiratory muscles
Guillain Bare Syndrome

- Patient needs monitoring of respiratory function and not pulse oximetry
- Intubate electively if decreased in respiratory function or difficulty protecting the airways
- Treatment is either plasmapheresis or IVIG, the steroids are not useful.
Spinal cord compression
Spinal cord compression/myelopathy

- Trauma
- Disc herniation
- Synovial cysts
- Medical conditions
  - metastasis
    - multiple myeloma
    - lymphomas
    - lung cancer
    - breast cancer
    - prostate cancer
    - kidney cancer
    - sarcomas
Spinal cord compression/myelopathy

• Clinical features
  ○ Examination shows upper motor neuron signs
    ▪ Babinsky present
    ▪ Brisk DTR
  ○ prodrome (can precede the event weeks to months)
    ▪ unremitting severe back pain
    ▪ unremitting severe radicular pain
    ▪ or both
  ○ stage of spinal compression
    ▪ subtle weakness and/or numbness in the legs
    ▪ urinary hesitancy, urgency and retention
    ▪ in a few day patient becomes paraplegic
Spinal cord compression/myelopathy

- MRI with contrast or CT myelogram are the exams of choice
  - Spinal cord ends at L1, obtain the imaging of the proper CNS section/s
  - Plain CT of spine is not enough

- Treatment
  - Directed by the nature of the spinal cord lesion
  - IV steroids
  - Radiation therapy
  - Surgery