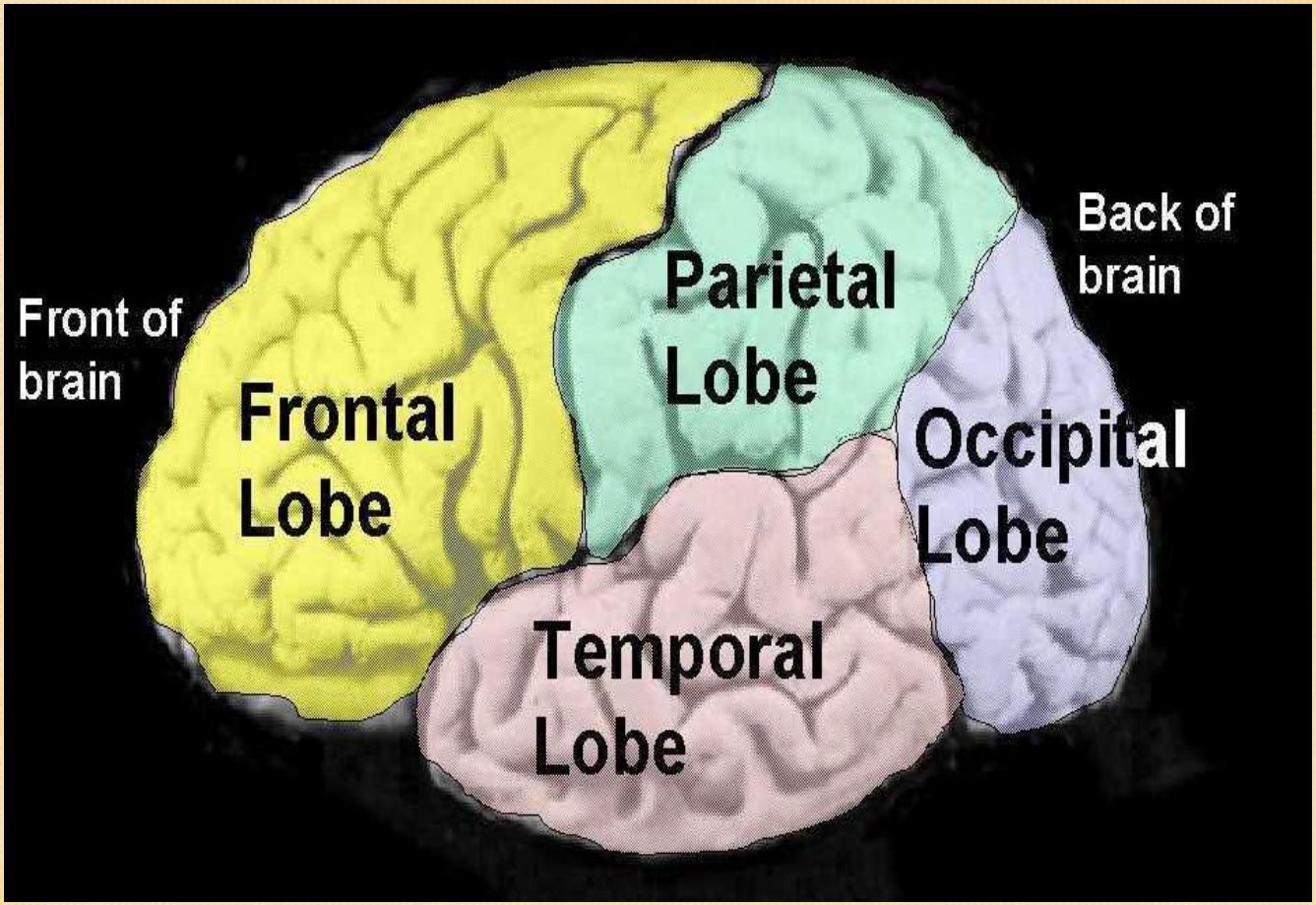
Problems of Neurological Function

Unit 10

Independent Student Review

- Brain Anatomy and physiology of cerebral hemispheres, diencephalon, brain stem, and cerebellum
- Meninges, ventricles, flow of CSF
- Blood Brain barrier
- Auto-regulatory mechanism (effects of CO_2 and pH or H+ ions)
- Circle of Willis
- Cranial Nerves

Independent Student Review
(continued)



Motor Cortex

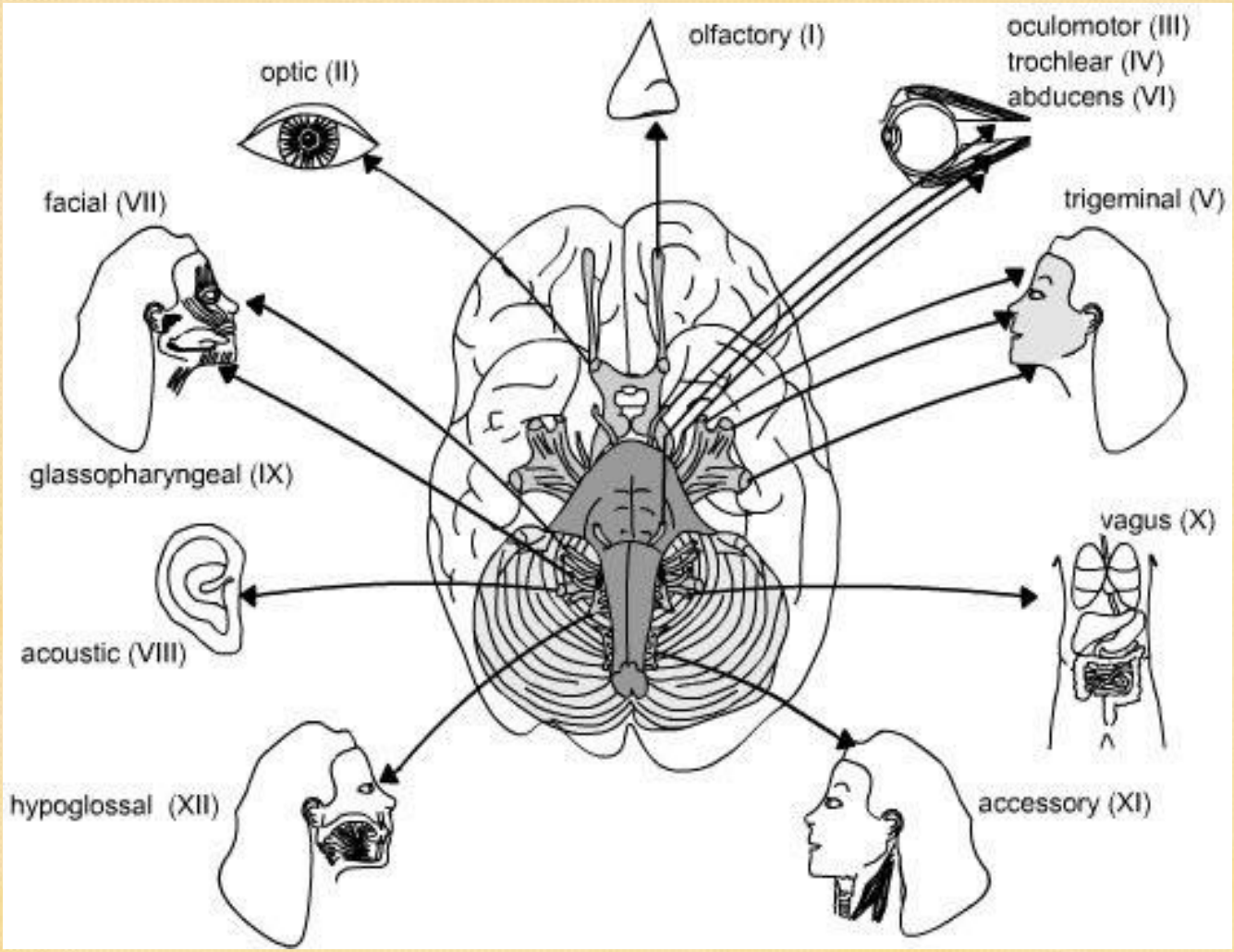
Broca's Area

Werricke's Area

Cerebellum

Four Ventricles

Independent Student Review
(continued)

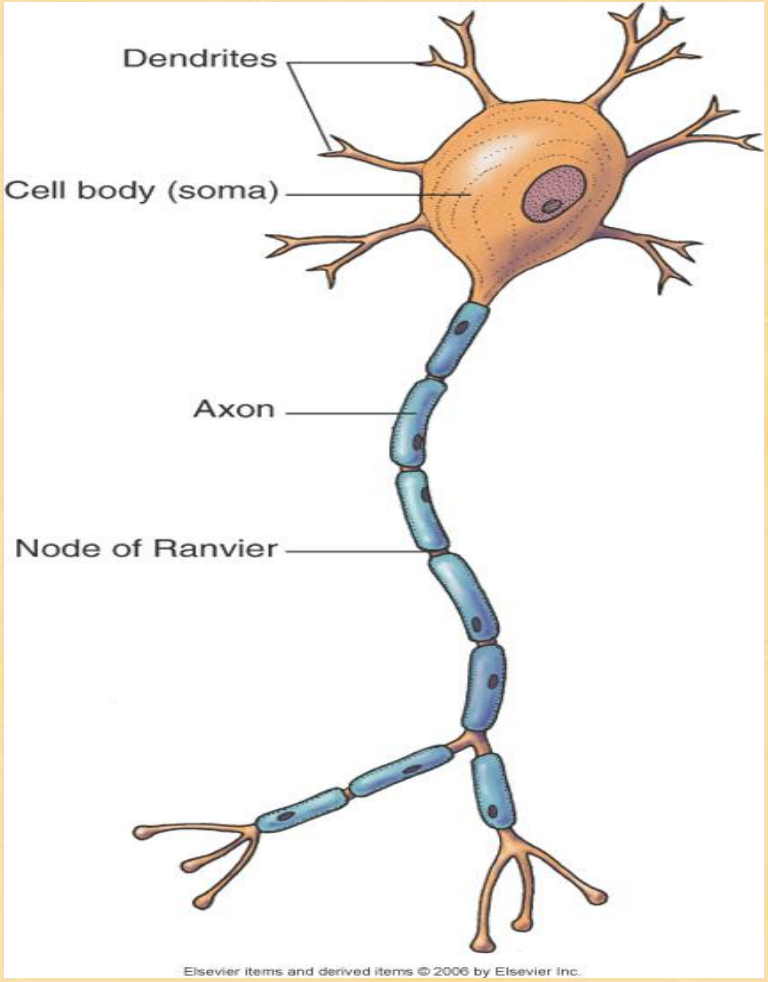


Neurological Disorders

- Multiple Sclerosis
- Amyotrophic Lateral Sclerosis – ALS
- Myasthenia Gravis
- Inflammatory Brain Conditions
- Neoplasms

Multiple Sclerosis

- What is it?
  - Demyelinating disorder of white matter of brain, SC, and optic nerve



Multiple Sclerosis

- Who gets it
  - Mostly the young and middle aged adult
  - Women 2X more often than men
  - First signs and symptoms 20 – 40 years of age

Multiple Sclerosis
Signs and Symptoms

- Exacerbations and remissions
- Fatigue and weakness
- Bowel and bladder dysfunction
- Vertigo
- Tinnitus
- Facial weakness
- Diplopia, nystagmus, optic neuritis
- Hot baths worsens symptoms

Signs and symptoms cont.

- Double Vision
- Electric shock sensations
- Slurred speech
- Lack of coordination
- Unsteady gait
- Stiffness or spasticity
- Forgetfulness
- Difficulty concentrating

Multiple Sclerosis

- Diagnosis
  - Stage 1 – MRI shows inflammation and lesions
  - Stage 2 – MRI shows demyelination
  - Sometimes CSF examined

MRI Preparation

- Signed consent
- Offer earplugs
- Sedatives for claustrophobia

- Contraindications include:

- Follow up care

Multiple Sclerosis

- Treatment
  - Symptomatic – muscle relaxers e.g. Baclofen
  - Steroids – especially with acute exacerbation
  - Immunosuppressive drugs
  - Interferon beta – 1a (Decreases number & severity of relapses)

Treatment continued

- Treatment of fatigue
- Treatment of depression
- Bladder control
- Muscle stiffness

MS treatment other than medication

- Physical Therapy
- Occupational Therapy
- Counseling
- Plasma exchange

Lifestyle and Home Remedies

- Rest
- Exercise
- Avoid heat
- Cool down
- Well balanced diet

Amyotrophic Lateral Sclerosis - ALS

Commonly known as
Lou Gehrig's Disease

Amyotrophic Lateral Sclerosis
ALS

- Who gets it
  - Affects mostly men between 40 and 60 years of age
- What Causes it
  - Degeneration of
    - UMN in Cerebral cortex
    - Cell bodies in the brainstem
    - Anterior horn cells of SC (degeneration starts in SC)

Amyotrophic Lateral Sclerosis
ALS

- What is not effected?
  - Entire sensory system
  - Regulatory mechanism of control
  - Coordination of movement
  - Intellect remains intact

Amyotrophic Lateral Sclerosis
ALS

- Signs and Symptoms
  - When LMN's die → denervation (= lateralsclerosis in SC's lateral column) →muscle atrophy (=amyotrophic)
  - Generalized muscle weakness
  - Paresis in localized muscle group (may manifest as muscle cramps in distal legs)

Amyotrophic Lateral Sclerosis
ALS

- Diagnosis
  - UMN involvement Dysphagia, dysarthria, dysphonia, spasm and rigidity, impaired fine motor control
  - LMN involvement: weakness, muscle atrophy, hyporeflexia, fasciculation
  - In some ways ALS sounds a little like MS
  - ALS is distinguished by impairment of respiratory muscle

Amyotrophic Lateral Sclerosis
ALS

- Treatment
  - No cure
  - Antispasmodic drugs and respiratory support
  - Medication:
    - Riluzole (Rilutek) – only drug available for ALS
      - May increase liver enzymes
  - Nursing
    - Prevent contractures
    - Prevent pneumonia

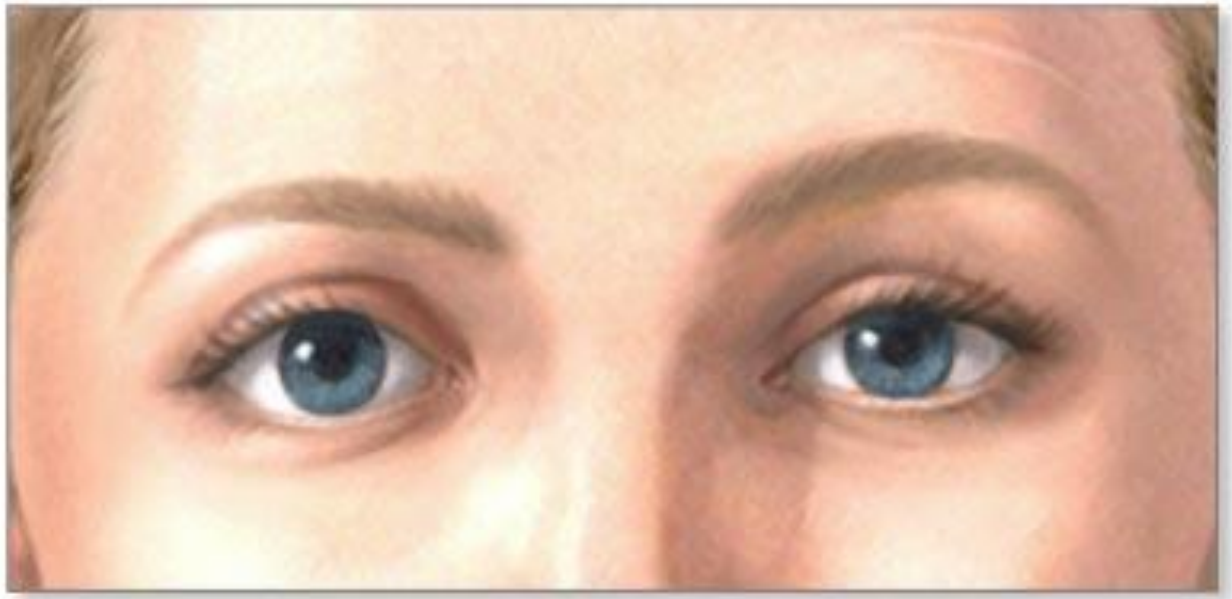
Myasthenia Gravis

- A disorder of the neuromuscular junction
- A deficiency of acetycholine receptors on muscle surface (there may be only 20% normal receptors)
- Muscle receptors are destroyed by an autoimmune process
- Defect in the transmission of nerve impulses to skeletal muscle

Clinical Manifestations

- Weakness of striated muscles especially eye muscle
- Evidenced by ptosis and diplopia
- Chewing andswallowing difficulties
- Weakness of muscles of the lower face
- Needs to support chin when talking

Ptosis (drooping of the eyelid)



Diagnosis

- History and Physical examination
- Thyroid study
- Testing immune disorders
- Acetacholine receptor antibody testing
- CT scan
- The Tensilon Test

Treatment

- Medication Mangement
  - Antocholinesterase (Cholinergic)
  - Immunosuppressive Therapy
    - Prednisone
      - Start at 20 mg increase daily to 60 mg dose
      - Continue for 3 months or until clinical improvment
      - Taper gradually to every other day
    - Azathioprine (Imuran)
      - 2 mg / kg/ day

Crisis

Myasthenic Crisis

- Result of severe disease or too little cholinesterase inhibition
- The patient is unable to maintain an airway or make sufficient respiratory movement and requires ventilation
- Increased BP and Pulse
- Increased secretions leading to Ineffective airway clearance

Cholinergic crisis

- Nausea
- Vomiting
- Diarrhea
- Abdominal cramps
- Blurred vision
- Pallor
- Facial muscle twitching
- Pupillary miosis
- Hypotension

Crisis (cont)

- Myasthenic Crisis my be precipitated by a number of factors:
  - Non-compliance with medications
  - Excessive activities
  - Infection

Inflammatory Brain Conditions

- Abscess
- Meningitis
  - Viral
  - Fungal
  - Bacterial
- Encephalitis
  - Arboviruses
  - Enteroviruses
  - Herpes Simplex Virus Type I
  - Amebae
- Vasculitis

ABSCESS

- Bacterial
  - Secondary to Paranasal sinuses
  - Mastoids
  - Middle ears
  - Seeding

- Fungal
  - Coccidiodomycosis
  - Mucormycosis
  - Aspergillosis
- Parasitic
  - Neurocysticerosis

Meningitis

- Bacterial
- Viral
- Fungal

Complications of Meningitis

- Communicating hydrocephalus
- Loculated CSF collections
- Subdural effusion / empyema
- Cerebral infarction
- Cerebral abscess
- Dural sinus thrombophlebitis

Neoplasms

- Primary Tumors
- Secondary Tumors

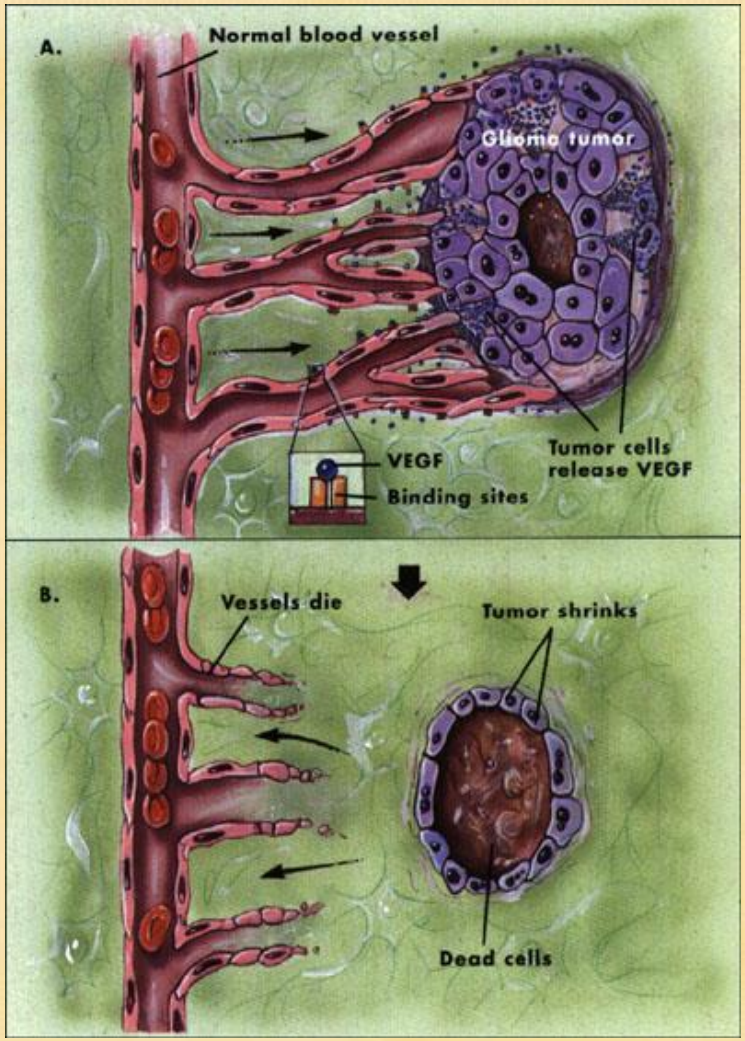
- PATHOPHYSIOLOGY
  - Cerebral Edema / brain tissue inflammation
  - Increased ICP
  - Focal neurologic deficits
  - Obstruction of the flow of CSF
  - Pituitary dysfunction

Classification of Tumors

- Malignant or Benign
- Location
- Cellular Histologic or Anatomic Origins

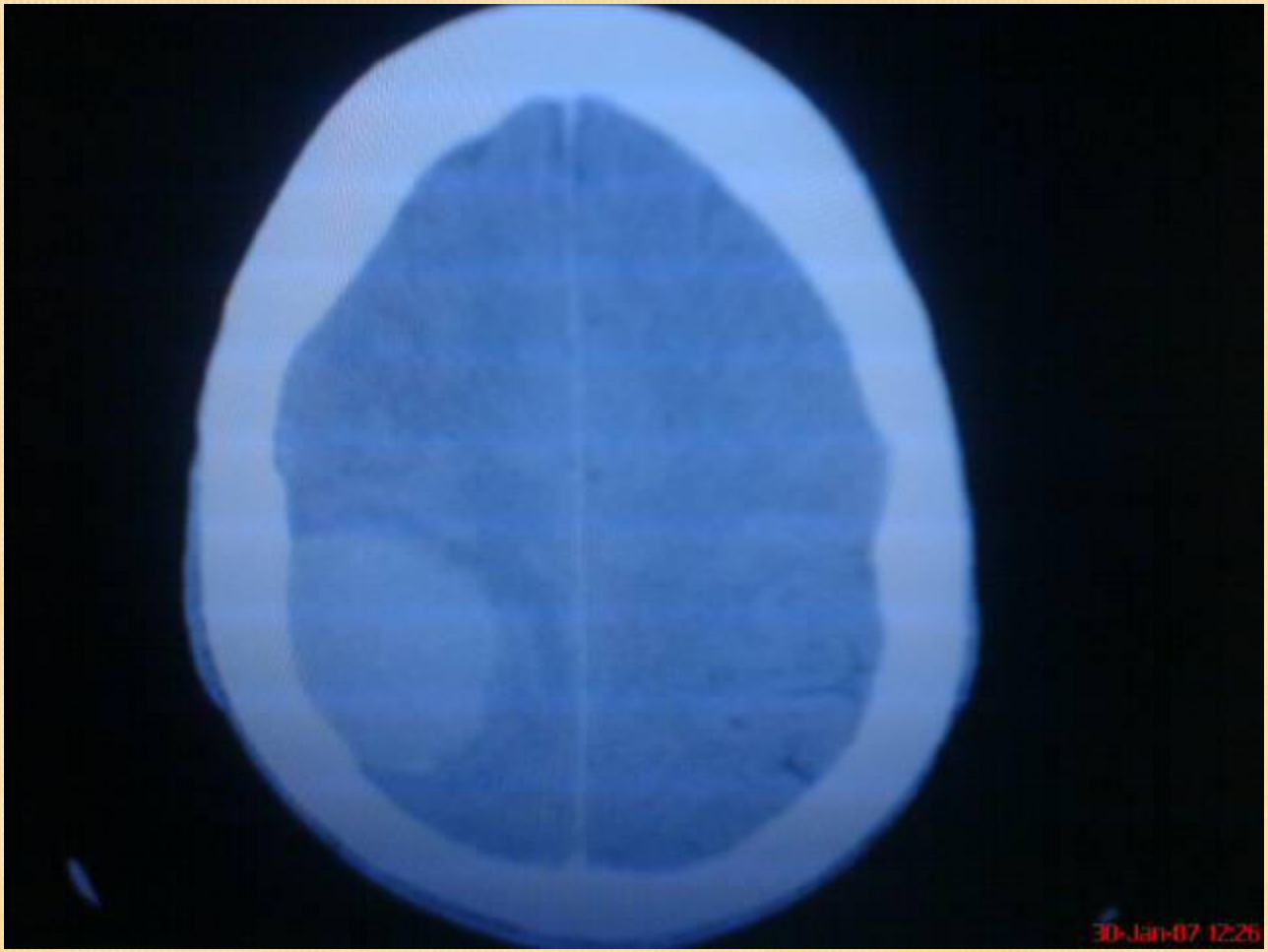
Primary tumors of the brain

Gliomas



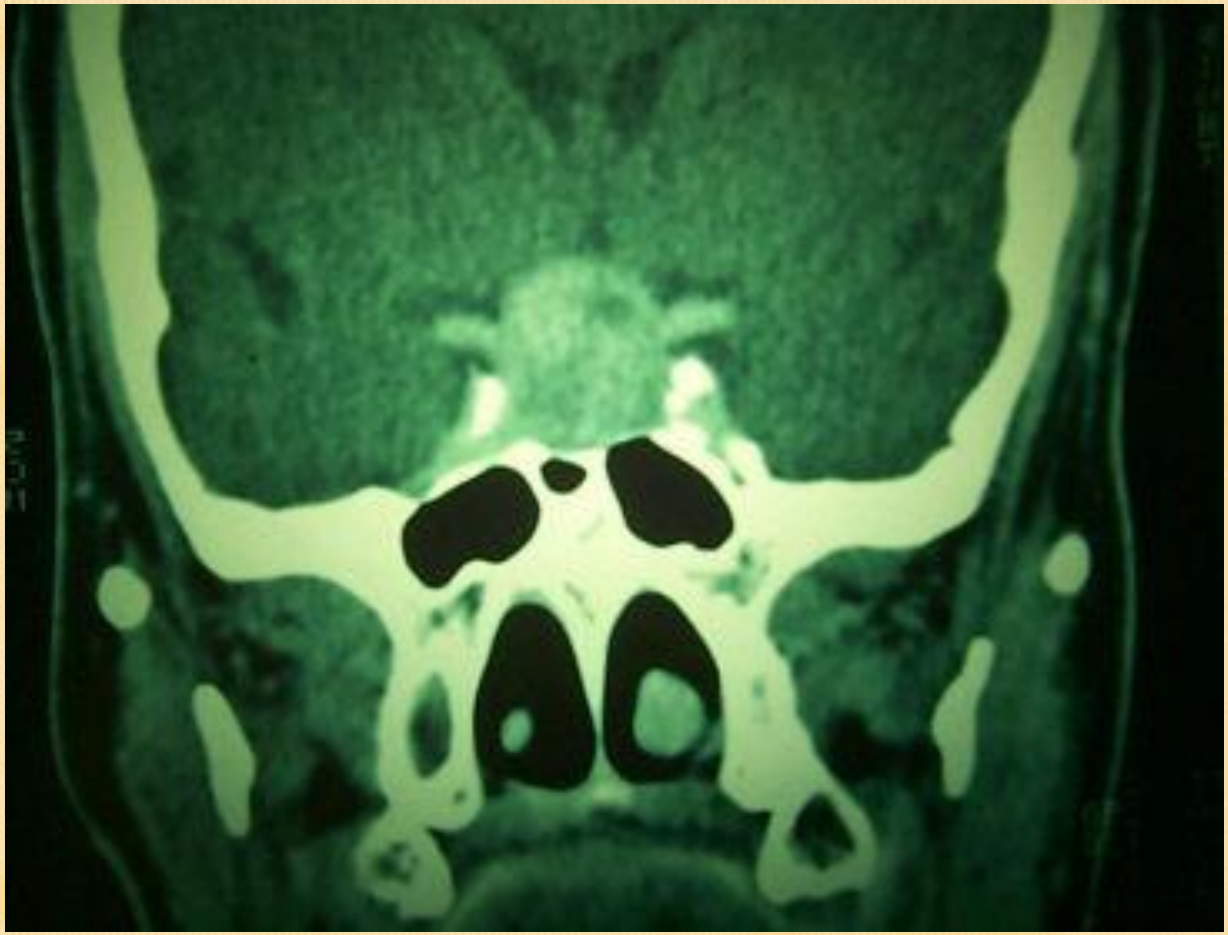
Primary tumors of the brain

Meningiomas



Primary tumors of the brain

- Pituitary tumors

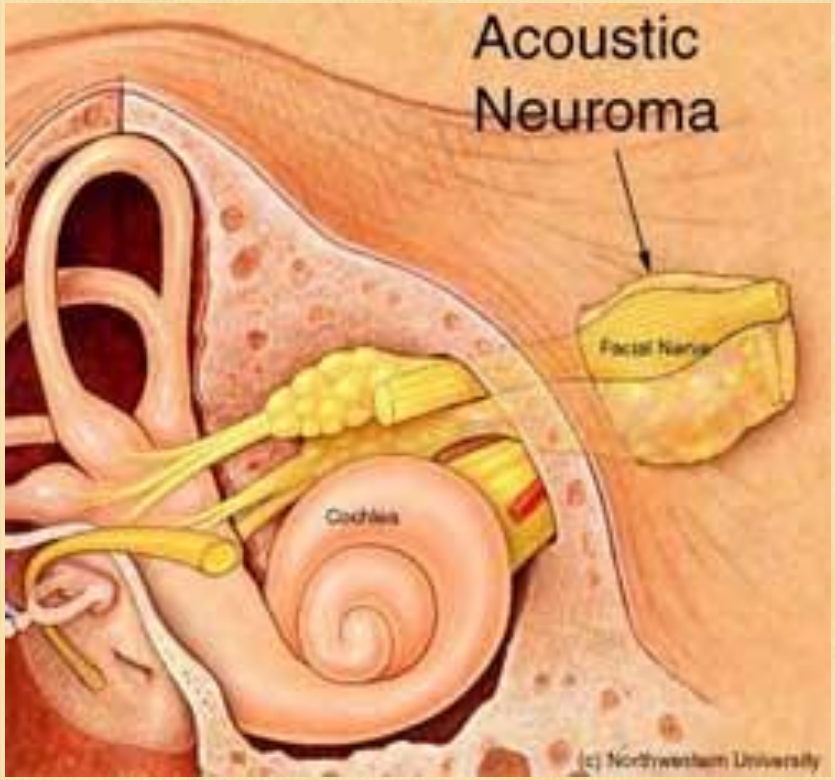


Treatments

- Surgery
- ETTH
- Transcranial hypophysectomy
- Radiation therapy
- Medications

Primary tumors of the brain

- Acoustic Neuromas



Secondary tumors of the brain

- Most common origins
  - Lungs
  - Breast
  - Colon
  - Pancreas
  - Kidney
- General symptoms
  - Headaches
  - Nausea and vomiting
  - Visual symptoms
  - Seizures
  - changes in mentation or personality
  - Papilledema – swelling of the optic disc

Secondary tumors of the brain

- Diagnosis
  - Physical Exam
  - Neurologic Exam
  - CT scan
  - MRI
  - Angiogram
  - Spinal tap
  - Myelogram
  - Biopsy
    - Needle
    - Stereotactic

Secondary tumors of the brain

- Interventions
  - Nonsurgical Management
    - Radiation
    - Drug Therapy
    - Chemotherapy
    - Radiosurgery
      - Gamma Knife
  - Surgical Management

- MS
  - http://www.youtube.com/watch?v=DvaJ9py-vOc&NR=1
- MG
  - http://www.youtube.com/watch?v=jNRaVnkQGs4&feature=PlayList&p=9C0081BB02C2F93D&playnext=1&playnext_from=PL&index=30

ALS

http://www.youtube.com/watch?v=W_0TcqNtKVI

http://www.youtube.com/watch?v=fKzZUnH7Wuk