

LOCALIZATION OF NEUROLOGIC DISEASE

On this page: Just below for Brain and subdivisions, and cases

- **BRAIN**

Look for alteration in consciousness, deficits of the face/eyes.

- Cortical
 - Anterior cerebral distribution - contralateral leg weakness, sensory loss.
 - Middle cerebral distribution - contralateral face & arm leg, +/- visual field cut, gaze palsy.
 - right- Left hemineglect and apathy, spatial disorientation.
 - Left.- Aphasia - frontal - expressive.
 - temporal - receptive.
 - Posterior cerebral distribution
 - Visual field loss +/- macular sparing.
 - Alexia without agaphia (left + corpus callosum).
- Subcortical (Lacunes)-
 - Internal capsule - Pure motor hemiplegia.
 - Thalamus/int. capsule - Pure sensory hemianesthesia.
 - pons - Clumsy hand/dysarthria syndrome.
 - Multiple sites - "subcortical dementia", +/- pseudo-bulbar palsy.
 - Brainstem: Look for crossed signs between head and body.
 - Midbrain (Weber's): contralateral weakness ("UMN" face, arm, leg), ipsilateral CN III palsy.
 - Pons (Foville's): contralateral arm & leg weakness, ipsilateral "LMN" CN VII, ipsilateral gaze palsy, small pupils.
 - Medulla (Wallenberg's)
 - dizziness, nausea & vomiting
 - hoarse
 - dysphagia
 - loss of taste, all to ipsilateral side,
 - ipsilateral arm clumsiness,
 - ipsilateral sensory loss face
 - contralateral decreased PP body (LT, Vib, Prop normal)
 - ipsilateral Homer's
- Cerebellum:
 - Lateral: Ipsilateral UE dysmetria, dysdiadochokinesia, ataxia, intention tremor, dysarthria with "scanning" speech.
 - Central (metabolic, ETOH): Truncal & LE ataxia, disturbance of equilibrium, wide based gait, nystagmus, dysmetria on heel-to-shin.
- Spinal Cord: Look for sensory level, spinal tenderness, bowel/bladder dysfunction.
 - Brown-Sequard (hemicord syndrome): ipsilateral weakness, contralateral numbness.

- Transection or transverse myelitis: Bilateral weakness and sensory level. First decreased DTR'S, later may be brisk.
- Syring (central cord syndrome): "shawl pattern" numbness, flaccid weakness UE withwasting, spastic weakness of LE.
- Anterior Horn Cell (motor) = Amyotrophic Lateral Sclerosis: weakness, fasciculations, wasting (especially UE), spasticity of legs and hyperreflexia, no sensory loss.
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- **PERIPHERAL NERVOUS SYSTEM**
 - Neuropathy- all modalities affected to some degree.
 - Root (radiculopathy)- Pain, focal weakness and wasting, sensory loss along a dermatomal distribution, history of back pain, spinal arthritis or disc disease.
 - Local (mononeuropathy): findings along a particular nerve distribution, localized wasting, history of trauma or compression, or occupational history.
 - Diffuse (polyneuropathy)- "glove and stocking" distribution, pain and paresthesias of toes,fingers-, loss of distal DTR'S, loss of vibration and proprioception, weakness distal prox.. history of ETOH, PVD, or DM.
 - Guillain-Barre (polyradiculoneuropathy)-. ascending weakness, +/- sensory loss and pain. Wasting in chronic form.
 - Neuromuscular junction: fluctuating weakness, wasting.
 - Myasthenia gravis - weakness increases with exercise.
 - Eaton-Lambert syndrome - strength increases with exercise (often associated with neoplasm).
 - Myopathy: sensory usually not involved, although may have pain. Weakness is proximal distal.
 - Myositis - look for associated findings such as rash, alopecia, joint pain/swelling.
 - Hereditary myopathies - exercise intolerance, progressive weakness.

NEUROLOGICAL LOCALIZATION - CASES

26 year-old female graduate student was conducting a philosophy seminar when she suddenly started stuttering and then became incoherent. She seemed confused, and her mouth was twisted. One arm hung limply and she walked unsteadily. She had a past history of rheumatic heart disease and took no meds except for birth control pills.

- What type of neurologic problem is this?
- What is the most likely localization?
- Which hemisphere?
- Which arterial supply?
- What is the most likely source or pathophysiology?

68 year-old white female presents with CC of inability to walk. Upon further questioning you find that this has progressed over a month or two and is not associated with back pain. On exam she is slightly inattentive and sometimes inappropriate. Language is intact. She has no CN deficits, and good strength of the UE's. Her legs are diffusely weak, 3 to 4 over 5, proximally and distally. Sensory exam reveals questionable mild loss of LT/PP distally of LE's, with no demarcated level. Reflexes are brisk in the legs and she has bilateral Babinski's.

- Where is the lesion?
- That mechanism would you suspect?

55 year-old black female with a history of DM and Htn states that while drinking her morning coffee she suddenly experienced "heaviness" of the right arm. She fumbled with the cup until she spilled the coffee, and when the symptoms did not resolve within a half hour she reported to the ER. Examination reveals an alert woman with normal mental status, decreased LT, PP, Vibration over the right arm and leg. Strength is objectively normal.

- Which arterial distribution is involved?
- What is the likely pathophysiology?

Your friend, who is a body builder, complains of sudden back pain and the inability to walk. Your exam reveals bilateral leg weakness, with absent ankle reflexes, decreased tone in legs. He feels paresthesias running down the back of both legs, and didn't notice you sticking him with a pin until you got to the mid-thigh. Pressure on the lumbar spine causes pain, and he has paralumbar spasm.

- Is this spinal lesion UMN or LMN?
- At what approximate level?
- What do you think happened?

A 35 year-old black male is seen in clinic with 3 month history of weakness and muscle cramps, first felt in the left arm but progressing to both legs. His voice is not as loud as it used to be, and is a little hoarse. Sometimes food gets "stuck" on one side of his mouth and he has to move it with his finger. He has no sensory loss. Reflexes are brisk, including a jaw jerk. The toes are equivocal. Fasciculations are present in the tongue at rest, and all four proximal extremities. One year later he has difficulty swallowing, is short of breath and appears emaciated.

- Can you localize the lesion?

A 62 year-old woman complains of pain and numbness of the hand. She has been dropping objects from the hand, but the discomfort is worse at night.

- What further history is pertinent to localizing the problem?
- What signs are indicative of a peripheral mononeuropathy?
- On examination you also find a loss of pinprick at the toes-, and vibrations of a C-128 tuning fork are felt for 10- 15 seconds at the toes.
- What do you suspect?
- What other findings may be present?

A 16 year-old woman is referred to you by her psychiatrist. For the last year she has complained of weakness which came on after the death of her father. The weakness seems to come and go depending on her family situation or her depression. She also complains of a vague tightness of her throat ("globus hystericus"), leg aching and frequent headaches. Sometimes she is fine, and other times she just lays on the couch, or will suddenly fall walking off a curb. She admits she doesn't know anymore why she can't pull herself out of this.

- How will you proceed to evaluate the weakness?
- Localize the disease?
- What is causing her headaches her "lump in the throat"?

A 30 year-old white female has difficulty climbing stairs. She cannot lift objects but has no problems writing or buttoning her shirt. Her gait is waddling. She has been followed for 8 months in the rheumatology clinic for "arthritis". A visit to the walk-in clinic prompted her appointment with neurology. Her joints have good range of motion and are nonfluctuant. Her muscles are tender to palpation.

- Where is the problem?
- What lab tests are pertinent?

A 28 year-old white female complains of headaches for 1 year, recently daily. They are often throbbing, usually bitemporal and do not usually cause too much nausea, although she has vomited once or twice. She also says her vision has changed, but she went to get her glasses checked and they told her they were fine. Other pertinent history is obtained that she had a child 9 months ago, and gained 80 pounds during pregnancy. She has lost 30. On physical exam, she is obese. Vital signs are normal. Funduscopic exam shows bilateral disc margin blurring with a flame hemorrhage in the right. Pupils are equally reactive. Visual fields are full on finger confrontation. There is a question of mild lateral rectus weakness on the right. The rest of the cranial nerves are normal as is her strength, sensation, and reflexes. There is no Babinski. Coordination and gait are intact. CT of the head is normal. EEG is normal. CSF is normal except for an opening pressure of 410 mm H₂O.

- What is the name of this syndrome?
- What severe disability is she at risk for?
- What would you expect to see on formal visual field testing (perimetry)?