Advanced Assessment in Clinical Practice:
Neurological Disorders

I. Neurological disorders

A. Headaches and symptoms

1. Primary headaches are classified by the clinical pattern.

- Clinical exam is usually normal and is of limited value.
- Look closely at the patient's history.
- Initial treatment is relief of the discomfort.
- Prophylactic treatment to prevent the recurrence. Very important in migraines and cluster headaches.
- Types of primary headaches

Tension	• Highest prevalence rate. • Women have slightly higher rate. • Peak onset 35-40 years and then decreases. • Tightening sensation. • Mostly in the forehead. • Can extend into the neck.
Cluster	• Severe, excruciating pain. • Tends to be unilateral around and above the eye and along the side of the head. • Restlessness or agitation during the episode. • May see ipsilateral tearing, runny nose or nasal blockage and ptosis. • Daily attacks lasting 15-180 minutes for several weeks and then a period of remission. • Usually see a cluster of 6-12 weeks. • Followed by remission as long as 12 months.
Migraine	• Most disabling. • Most common to require medical attention. • Under diagnosed and undertreated. • Women have high prevalence. • Inversely correlated with income and educational level. • Can be with or without an aura.

2. Secondary headaches are caused by an underlying disorder. Will see additional clinical manifestations.
   - Hypertension
   - Brain tumor
   - Meningitis
   - Encephalitis
   - Sinusitis
   - Subarachnoid hemorrhage
   - Cerebral venous thrombosis
   - Primary angle-closure glaucoma
   - Cervical spine pathology
   - Temporal arteritis

3. "Red Flags" in assessment
   - Progressive worsening
   - Different quality of headache
   - Headache described as worst ever
   - Maximum severity at onset
   - New onset after the age of 50 years
   - Confusion or memory loss
   - Papilledema
   - Visual field defect
   - Cranial nerve asymmetry
   - Extremity weakness
   - Gait disturbances

B. Meningitis: Inflammation of the meninges of the brain and spinal cord. There are various types depending on the causative agents. Symptoms appear suddenly and patients appear acutely ill. The younger the patient, the more devastating the long term consequences.

Lab effects: Meningitis CSF
- Viral: Low WBC, normal to slightly elevated glucose and protein. High opening pressure. Clear to cloudy.
- Bacterial: High WBC, increased protein, and low glucose. High opening pressure. Turbid and cloudy.

1. Bacterial

2. Viral or aseptic

3. Subacute or chronic

4. Assessment
   - Headache
   - Vomiting
   - Fever
   - Tachycardia
   - Hypotension
   - Photophobia
   - Ocular palsy
   - Papilledema
   - Seizures
   - Unilateral or bilateral sensory loss
   - Vertigo and hearing loss (CN VIII)
   - Signs of increased intracranial pressure
   - Rash with meningococcal

5. Meningeal signs on assessment

   - Nuchal rigidity: Any attempted flexion of the neck causes severe pain due to muscle spasms.

   - Kernig's sign

   - Brudzinski's sign

C. Delirium and dementia

Characteristic	Delirium	Dementia
Onset	Sudden	Insidious.
Duration	Hours, days	Persistent.
Time of day	Worse at night and when drug levels peak, sleep-wake cycle disturbed.	Stable, no change.
Cognitive impairment	Memory, attentiveness, consciousness, calculations.	Abstract thinking, judgment, memory, thought patterns, calculations.
Activity	Increased or decreased, may fluctuate; tremors, spastic movements.	Unchanged from usual behavior.
Speech/language	Slurred or rapid and manic, rambling, incoherent.	Disordered, rambling, incoherent; struggles to find words.
Mood and affect	Rapid mood swings; fearful, suspicious.	Depressed, apathetic, uninterested.
Delusions/ Hallucinations	Visual, auditory, tactile, hallucinations, delusions.	Delusions, no hallucinations
Associated factors or triggers	Physical conditions, drug toxicity, head injury, change in environment, vision or hearing problems.	Chronic alcoholism, vitamin B12 deficiency, Huntington chorea, arterial disease, HIV infection, Alzheimer's, syphilis.
Reversibility	Potential	Progressive

D. Increased intracranial pressure and herniation syndromes

1. General assessment findings in herniation
   - Headache
   - Restlessness
   - Irritability
   - Confusion
   - Lethargy
   - Vomiting
   - Seizures
   - Diplopia
   - Ataxia

2. Cushing's triad

   - Bradycardia

   - Increased SBP with a widening pulse pressure

   - Abnormal respiratory pattern, pupil changes, cranial nerve dysfunction are based on the amount of pressure in the brain and the area being compressed

Diencephalon	• Small and reactive pupils. • Cheyne Stokes respirations.
Midbrain	• Mid-position and fixed pupils. • Central neurogenic hyperventilation. • CN III and IV dysfunction.
Pons	• Pinpoint pupils. • Apneustic breathing. • Cluster (Biot's) breathing. • CN 5, 6, 7, and 8 dysfunction.
Medulla	• Pupils fixed and dilated. • Ataxic breathing. • CN 9-12 dysfunction.

3. Posturing

<u>Decorticate posturing</u>
- Pressure above the brain stem
- Manifests midbrain deterioration
- Small reactive pupils

<u>Decerebrate posturing</u>
- Pressure on the brain stem
- Fixed pupils and poor prognosis
- Corneal reflex absent

4. Herniation syndromes

Early uncal	• Decreasing level of consciousness. • Respiratory pattern normal. • Ipsilateral pupil dilated, reacts slightly to light. • Generally, appropriate motor response. • On the side opposite the bleed or lesion. o May see some resistance to movement. o Positive Babinski.
Late uncal	• Further decrease in level of consciousness. • Regular, sustained hyperventilation. • Rarely Cheyne-Stokes ventilation. • Ipsilateral pupil widely fixed and dilated. • Contralateral hemiparesis. • Decorticate or decerebrate posturing.
Central	• Occurs with large lesions of the cerebral hemispheres. • Decreased level of consciousness. • Decorticate and then cerebrate posturing.
Tonsillar	• Occurs due to a mass in the posterior fossa. • Lower cranial nerve palsies. • Cerebellar abnormalities. • Meningeal irritation. • Respiratory irregularities.

E. Epidural hematoma: Accumulation of blood between the skull and the stripped-off dura membrane. It is usually caused by a focused blow to the head. It most often involves the middle meningeal artery by a temporal bone fracture.

Classic presentation
- Loss of consciousness.
- Short period of lucidness.
- Intense headache.
- Rapid deterioration from drowsiness to coma.

Other assessments
- Headache.
- Fixed dilated pupil on the side of the bleed.
- Loss of vision in the other eye.
- Hemiparesis on the side of the bleed.
- Hemiplegia
- Possible seizures.

F. Subdural hematoma: A venous bleed with a build-up of blood between the dura mater and the arachnoid mater which surrounds the brain. Often due to trauma with significant force which causes the hematoma and other severe injuries as well. Mortality rate is 60% to 80% with an acute bleed due to increased intracranial pressure.

1. Usually the result of a serious head injury. When this is the cause, they are referred to as "acute" subdural hematomas.

2. Subdural hematomas can also occur spontaneously or after a very minor head injury, especially in the elderly. These go unnoticed for many days to many weeks, and are referred to as "chronic" subdural hematomas.

3. Assessment
   - Slow thinking
   - Confusion
   - Drowsiness
   - Lethargy
   - Irritability
   - Headache
   - Signs of a stroke.
   - Pupil dilation on the side of the bleed.
   - Sluggish pupillary response.
   - Possible seizures.

G. Parkinson's disease

1. A chronic, slowly progressive degenerative condition resulting in impaired voluntary movement and loss of control of the autonomic nervous system. The symptoms seen are a result of an imbalance in dopamine and acetylcholine. The loss of dopamine leads to the symptoms of tremors, muscle rigidity, and bradykinesis. The increased amount of acetylcholine leads to the symptoms such as increased salivation, increased perspiration, and orthostatic hypotension.

2. Other assessment findings
   - Bradykinesia
   - Cogwheel rigidity
   - Muscle cramps and aching
   - Constipation
   - Urinary frequency
   - Stress incontinence
   - Speech difficulties
   - Frequent falls
   - Never smiles
   - Excessive sweating
   - Difficulty swallowing
   - Micrographia
   - Echolalia
   - Orthostatic hypotension
   - Resting tremors of the hands and pill rolling. Tremors may spread to other extremities, lips, tongue and jaw
   - Shuffling gait, stooped posture and impaired balance.
   - Decreased eye blink and impaired upward gaze.
   - Dementia, depression and anxiety.

H. Transient ischemic attack (TIA): Brief episode of neurological dysfunction caused by focal or retinal ischemia with clinical symptoms typically lasting less than one hour and without evidence of acute infarction.

1. Assessment
   - Most common is unilateral weakness, numbness or tinging in a limb.
   - May see numbness of the face, hand or leg without weakness.
   - Paralysis
   - Slurred speech
   - Dizziness
   - Confusion
   - Head pain
   - Imbalance
   - Aphasia
   - Double vision
   - Hemianopsia
   - Transient monocular blindness

2. May last 5-15 minutes or a full hour. Full recovery in 24 hours.

I. Ischemic and hemorrhagic strokes

1. General assessment findings

Right hemisphere stroke
- Neglect of the affected side
- Left sided hemiparesis or hemiplegia
- Left visual field deficit
- Impulsive behavior
- Spatial-perceptual deficits

Left hemisphere stroke
- All forms of aphasia
- Right sided hemiparesis or hemiplegia
- Right visual field deficit
- Slow cautious behavior

Hemorrhagic stroke
- Severe headache
- Seizures
- Dizziness and decreased LOC
- Nausea, vomiting, and diaphoresis
- Nuchal rigidity, photophobia and visual changes.

Types of aphasia
- Receptive aphasia
  - o Damage to Wernicke's center
  - o Temporal lobe
  - o Can't understand language
- Expressive aphasia
  - o Damage to Brocca's center
  - o Frontal lobe
  - o Can't use language
- Global aphasia
  - o Damage to both centers
  - o Can't understand or use language

2. Hemorrhagic stroke is classified by the location the hemorrhage.

- Intracerebral accounts for 88% of hemorrhagic strokes. Found most often in the elderly. Most often associated with hypertension.

- Subarachnoid is most often seen in patients 20 to 60 years old. It is due to a ruptured aneurysm or AV malformation. Patients may describe a popping or snapping sensation in the head. Pain is often worse near the back of the head.

3. Ischemic strokes are classified by the area of the occlusion.

Internal carotid	• Severe paralysis and loss of sensation on the opposite side of the stroke. • Blindness on the side of the stroke.
Anterior cerebral artery	• Paralysis and loss of sensation of the lower extremities of the opposite side. • Slow thought process and easily distracted. • Aphasia in some.
Middle cerebral artery	• Hemiplegia or hemiparesis of the opposite side. • Homonymous hemianopia. • Aphasia in some.
Posterior cerebral artery	• Hemiplegia on the opposite side which is greater in the face and upper extremities than the lower extremities. • Receptive aphasia. • Homonymous hemianopia.
Vertebral or basilar artery occlusion	• Unilateral or bilateral weakness of the upper extremities. • Diplopia. • Homonymous hemianopia.
Cerebellar infarction	• Poor coordination of voluntary movement. • Positive Romberg's test.

4. Gait patterns in stroke patients

Cerebellar gait pattern	• Feet are wide based. • Staggering and lurching from side to side are often accompanied by swaying of the trunk.
Sensory ataxia	• Feet are thrown forward and outward, bringing them down first on heels, then on toes. • Patient watches the ground to guide his or her steps.