Acquired Neuropathies

GBS • CIDP • METABOLIC • CLINICAL SCENARIOS **KMU FINAL YEAR NEUROSCIENCES**

1. GUILLAIN-BARRÉ SYNDROME (GBS)

Mechanism: Acute Inflammatory Demyelinating Polyneuropathy (AIDP). Post-infectious autoimmune attack on myelin.

Classic History:
- Antecedent infection 1-3 weeks prior (Diarrhea or URTI).
- **Campylobacter Jejuni** is the most common trigger.
- Progressive weakness starting from lower limbs.

GBS = "Ground to Brain Syndrome"
- **Ascending Paralysis:** Starts at toes, moves up to respiratory muscles.
- **Areflexia:** Early loss of deep tendon reflexes (Key differentiating sign).
- **Autonomic Dysfunction:** Fluctuating BP, Tachycardia/Bradycardia.

🚨 **RESPIRATORY PARALYSIS**
The primary cause of death.
Monitor: Forced Vital Capacity (FVC).
Action: Elective Intubation if FVC < 20 ml/kg or if bulbar palsy develops.
Don't wait for ABGs to show hypoxia; the patient will tire out first.

2. MANAGEMENT OF GBS

Q: Role of Steroids?
Contraindicated. Studies show they do not help and may delay recovery.

Q: Definitive Treatment?
1. **IVIG** (Intravenous Immunoglobulin) - 0.4g/kg/day for 5 days.
2. **Plasmapheresis**.
Both are equally effective. Do not combine them.

3. CIDP (CHRONIC GBS)

Definition: Chronic Inflammatory Demyelinating Polyneuropathy.
Time Course: Progression > 8 weeks (2 months).
Key Difference: Unlike GBS, **Steroids ARE effective** and are first-line treatment.

4. DIABETIC NEUROPATHY

Most common cause of neuropathy worldwide.

Patterns:
1. **Distal Symmetrical:** "Glove and Stocking". Sensory loss > Motor. Small fiber (pain/temp) or Large fiber (vibration/proprioception).
2. **Mononeuritis Multiplex:** Infarction of vasa nervorum. Sudden wrist/foot drop or CN III palsy (pupil sparing).
3. **Autonomic:** Silent MI, Postural hypotension, Gastroparesis.

5. METABOLIC & TOXIC CAUSES

Cause	Pattern / Feature
Vitamin B12	**Subacute Combined Degeneration:** Dorsal Columns (Vibration) + Corticospinal (UMN signs). *Result:* Ataxia + Upgoing Plantars.
Alcohol	Thiamine (B1) deficiency. Painful sensory neuropathy + Wernicke's features.
Isoniazid (INH)	Pyridoxine (B6) deficiency. Always co-prescribe B6.
Lead	Pure **Motor** Neuropathy. Classic "Wrist Drop".

6. CLINICAL SCENARIOS (HIGH YIELD)

Q: 25M, history of bloody diarrhea 2 weeks ago. Now presents with weakness in legs, unable to stand. O/E: Absent ankle jerks. Diagnosis?
Guillain-Barré Syndrome. The areflexia is the giveaway. Trigger: C. Jejuni.

Q: 55F with weakness in arms and legs progressing for 3 months. Difficulty climbing stairs. O/E: Proximal and distal weakness, areflexia. CSF: High Protein. Treatment?
CIDP. Duration > 8 weeks rules out GBS. Treat with Corticosteroids.

Q: 60M, Diabetic. Sudden onset severe pain in right thigh and wasting of quadriceps. Knee jerk absent. Diagnosis?
Diabetic Amyotrophy (Proximal Diabetic Neuropathy). Self-limiting but painful.

7. CSF ANALYSIS (THE DISSOCIATION)

Albuminocytologic Dissociation:
- **Protein:** High (> 45 mg/dL).
- **Cells (WBC):** Normal (< 10).
Found in GBS and CIDP. If cells are high (>50), suspect HIV or Lyme disease, not GBS.

Lower Limb Weakness

LOCALIZATION • CORD SYNDROMES • MS • RED FLAGS **FINAL YEAR NEUROSCIENCES**

1. THE ANATOMICAL LADDER (LOCALIZATION)

Q: Patient has weakness. First question?

Is it **UMN** (Upper Motor Neuron) or **LMN** (Lower Motor Neuron)?

Q: Signs of UMN Lesion (Brain/Cord)?

"Everything goes UP"

- Tone: **Spastic** (Increased).
- Reflexes: **Hyperreflexia** (Brisk).
- Plantars: **Upgoing** (Extensor/Babinski +).

Q: Signs of LMN Lesion (Nerve/Root)?

"Everything goes DOWN"

- Tone: **Flaccid** (Decreased).
- Reflexes: **Areflexia** (Absent).
- Plantars: **Down** (Flexor) or Mute.
- **Wasting/Fasciculations**.

Localization Cheat Sheet:
- **Brain:** Hemiplegia (Arm+Leg). Face involved. Seizures/Aphasia.
- **Spinal Cord:** Paraplegia (Both legs). Sensory Level. Bladder involved.
- **Peripheral Nerve:** Distal weakness. Glove & Stocking sensory loss. No bladder issues.
- **Muscle:** Proximal weakness (Combing hair, climbing stairs). Sensation NORMAL.

2. SPINAL CORD SYNDROMES

Syndrome	Deficit	Cause
Brown-Séquard (Hemisection)	• Ipsilateral: Motor + Vibration. • Contralateral: Pain/Temp.	Trauma (Stab), MS Plaque.
Syringomyelia (Central Cord)	• "Cape-like" loss of Pain/Temp. • Touch/Vibration Intact.	Arnold-Chiari Malformation.
Subacute Combined Degeneration	• Dorsal Column (Vibration) + Corticospinal (Motor).	Vitamin B12 Deficiency.
Anterior Cord	• Motor + Pain loss. • Vibration PRESERVED.	Spinal Artery Stroke.

3. SURGICAL EMERGENCIES

🚨 **CAUDA EQUINA SYNDROME**
Compression of lumbar nerve roots (LMN lesion).

The Triad:
1. Saddle Anesthesia (Numb bum).
2. Bladder/Bowel Dysfunction (Retention/Incontinence).
3. Lax Anal Tone (PR Exam is mandatory).

Action: Urgent MRI + Surgical Decompression within 24h.

4. MULTIPLE SCLEROSIS (MS)

See pg#8

Q: What is the classic definition?

CNS Demyelination disseminated in **Time** (multiple episodes) and **Space** (multiple lesions).

Q: Common presentations?

1. **Optic Neuritis:** Painful vision loss (Unilateral).
2. **INO (Internuclear Ophthalmoplegia):** Eye lag on lateral gaze.
3. **Sensory:** Lhermitte's Sign (Electric shock down spine on neck flexion).

Q: Diagnosis (McDonald Criteria)?

MRI Brain/Spine: **Periventricular Plaques** (Dawson's Fingers).
CSF: **Oligoclonal Bands** (IgG).

Q: Acute Management?

IV Methylprednisolone (High dose steroids) for 3-5 days.

5. SPINAL PATHOLOGY (POTT'S & SPINA BIFIDA)

Q: Pott's Disease (TB Spine) Triad?

1. Back Pain (Gibbus deformity).
2. Constitutional Symptoms (Fever/Weight loss).
3. Paraparesis (Cord compression by abscess).

Q: Spina Bifida Occulta?

Failure of posterior vertebral arch fusion. Often asymptomatic. Look for a **tuft of hair** or dimple over L5/S1.

Q: Meningomyelocele?

Herniation of meninges + cord. Severe deficits. Associated with **Chiari II** and **Hydrocephalus**.

6. CLINICAL SCENARIOS

Q: 25F, blurry vision in left eye 1 year ago. Now presents with weakness in right leg and urinary urgency. Reflexes brisk. Diagnosis?

Multiple Sclerosis. (Time: 1 year gap. Space: Eye + Leg + Bladder).

Q: 60M, back pain, sudden inability to pass urine, numbness in perianal area. Diagnosis?

Cauda Equina Syndrome. (Surgical Emergency).

Q: Child with cape-like loss of pain sensation in arms/shoulders. Burned hands without feeling it. Diagnosis?

Syringomyelia. (Central cord expansion damages crossing spinothalamic fibers).

Stroke Syndromes

1. CORTICAL STROKES (THE BIG 3)

Anterior Cerebral Artery (ACA):
• Affects medial frontal/parietal lobes.
• **Leg > Arm weakness.** (The homunculus dangles its legs in the center).
• Urinary Incontinence (Paracentral lobule).
• Personality changes / Apathy.

Middle Cerebral Artery (MCA) - Most Common:
• Affects lateral cortex.
• **Face & Arm > Leg weakness.**
• **Dominant (Left):** Aphasia (Broca's/Wernicke's).
• **Non-Dominant (Right):** Hemineglect (Ignores left side).

Posterior Cerebral Artery (PCA):
• Occipital lobe.
• **Vision:** Contralateral Homonymous Hemianopsia with **Macula Sparing**.
• Thalamic Syndrome: Severe contralateral pain.

Brainstem "Rule of 4s":
• Midbrain (CN 3, 4) -> **Weber's** (CN3 palsy + Contra Hemiplegia).
• Pons (CN 5, 6, 7, 8) -> **Millard-Gubler** (CN6/7 + Contra Hemiplegia).
• Medulla (CN 9, 10, 11, 12) -> **Wallenberg** (Lateral) or **Medial Medullary** (Tongue).

2. LACUNAR STROKES (SMALL VESSEL)

Type	Location	Features
Pure Motor	Posterior Limb of Internal Capsule	Hemiparesis (Face+Arm+Leg equal). No sensory loss. No Aphasia.
Pure Sensory	VPL Thalamus	Numbness/Tingling only. No weakness.
Ataxic Hemiparesis	Pons / Internal Capsule	Weakness + Ataxia (out of proportion to weakness).

3. BRAINSTEM SYNDROMES (HIGH YIELD)

Lateral Medullary Syndrome (Wallenberg):
• Artery: **PICA** (Posterior Inferior Cerebellar Artery).
• **Ipsilateral:** Facial numbness, Horner's Syndrome, Ataxia.
• **Contralateral:** Body pain/temp loss.
• **Specific:** Dysphagia, Hoarseness (Nucleus Ambiguus - CN 9/10), Vertigo.
Note: NO motor weakness in limbs (Pyramids are spared).

Medial Medullary Syndrome:
• Artery: **Anterior Spinal Artery**.
• **Ipsilateral:** Tongue deviation (CN 12).
• **Contralateral:** Hemiplegia (Pyramids) + Proprioception loss (Medial Lemniscus).

4. CLINICAL SCENARIOS

Q: Patient can't move right leg, wet himself, acts confused. Left arm is fine.
Left ACA Stroke. (Leg > Arm + Incontinence).

Q: Patient can't speak (Global Aphasia), right face and arm are paralyzed.
Left MCA Stroke. (Dominant hemisphere).

Q: Patient has right eye down/out (ptosis), left side body weakness.
Weber's Syndrome. (Midbrain lesion involving CN3 + Cerebral Peduncle).

5. TIA (TRANSIENT ISCHEMIC ATTACK)

Definition: Focal deficit < 24h (usually < 1h) with **NO infarction** on MRI.
Amaurosis Fugax: "Curtain coming down" over one eye (Carotid embolus to Retinal artery).
Risk Score: ABCD2 (Age, BP, Clinical features, Duration, Diabetes).
Management: Aspirin 300mg immediately + Specialist referral.

Hemorrhage & Management

6. HEMORRHAGIC STROKE (ICH)

Causes:
• **Hypertension (Most common):** Affects deep structures (Basal Ganglia, Thalamus, Pons, Cerebellum). Charcot-Bouchard aneurysms.
• **Cerebral Amyloid Angiopathy:** Elderly. Lobar hemorrhages (Occipital/Parietal).

Management:
• **BP Control:** Aggressive lowering (Target SBP < 140 mmHg). Use **IV Labetalol** or Nicardipine.
• Reverse anticoagulation (PCC for Warfarin, Idarucizumab for Dabigatran).
• Surgery (Craniotomy) if mass effect or superficial lobar bleed.

7. SUBARACHNOID HEMORRHAGE (SAH)

THE THUNDERCLAP
Presentation: Sudden "worst headache of life", vomiting, meningism.
Cause: Ruptured Berry Aneurysm (Post. Comm. Artery most common).

Investigation Sequence:
1. Non-contrast CT Head: (Star sign in basal cisterns).
2. If CT negative > 6hrs? Do Lumbar Puncture.
3. Look for Xanthochromia (yellow bilirubin) in CSF.

Complications:
• Re-bleeding (Highest risk 24h).
• Vasospasm (Days 3-14). Prevent with Nimodipine.
• Hydrocephalus (Blood clogs arachnoid granulations).

8. IMAGING STRATEGY

First Line: Non-Contrast CT Head.
• Why? To Rule OUT Hemorrhage. (Blood is bright white).
• Ischemic stroke may be normal in first 6 hours.

Diffusion Weighted MRI (DWI):
• Most sensitive for Ischemia (Bright within minutes).

9. ACUTE ISCHEMIC MANAGEMENT

"Time is Brain" Protocol:

1. Thrombolysis (Alteplase/tPA):
• **Window:** < 4.5 hours from "Last Known Well".
• **Contraindications:** Recent surgery, previous bleed, BP > 185/110, low platelets.

2. Thrombectomy (Mechanical):
• **Window:** < 6 hours (extended to 24h in selected cases).
• Indicated for Large Vessel Occlusion (LVO) - e.g., MCA stem.

3. Antiplatelets:
• If NO tPA: Aspirin 300mg immediately.
• If tPA given: Wait 24 hours, then scan again before starting Aspirin.

10. SECONDARY PREVENTION

Etiology	Prevention Strategy
Non-Cardioembolic (Atherosclerosis)	• **Clopidogrel 75mg** (Monotherapy is gold standard). • High-dose Statin (Atorvastatin 80mg). • BP Control.
Cardioembolic (Atrial Fibrillation)	• **Anticoagulation** (DOACs like Apixaban > Warfarin). • Start ~2 weeks after stroke (risk of hemorrhagic transformation).
Carotid Stenosis	• Endarterectomy if stenosis > 70% (Symptomatic).

11. CLINICAL SCENARIOS

Q: 65M, sudden headache, neck stiffness, BP 160/90. CT is normal. Next step?
Lumbar Puncture. Need to rule out SAH (Xanthochromia). CT can miss small bleeds after 12h.

Q: 70F with ischemic stroke. BP is 190/100. Should you lower it?
NO (unless giving tPA). Permissive hypertension up to 220/120 helps perfusion to the penumbra.

Q: Young patient with stroke + renal failure + Livedo Reticularis.
Polyarteritis Nodosa or **Antiphospholipid Syndrome** (if history of miscarriages).

Seizures & Epilepsy

1. THE DEFINITIONS

Seizure: Transient occurrence of signs/symptoms due to abnormal excessive/synchronous neuronal activity.

Epilepsy: A disease of the brain defined by:
1. At least **two unprovoked** seizures > 24h apart.
2. One unprovoked seizure with high recurrence risk (>60%).

Status Epilepticus:
• Seizure > 5 minutes OR
• Two seizures without regaining consciousness in between.
This is a medical emergency. Time = Brain death.

2. CLASSIFICATION (SIMPLIFIED)

Type	Consciousness	Features
Focal Aware (Simple Partial)	**Preserved**	Motor (twitching), Sensory (tingling), Autonomic (sweating).
Focal Impaired (Complex Partial)	**Impaired**	Automatisms (Lip smacking, picking at clothes), Confusion.
Generalized	**Lost** (Always)	Involves both hemispheres immediately.

3. GENERALIZED SEIZURE TYPES

Tonic-Clonic (Grand Mal): Stiffening (Tonic) -> Jerking (Clonic). Post-ictal confusion.
Absence (Petit Mal): Staring spells. No post-ictal confusion. <10 seconds. (School failure).
Myoclonic: Sudden, brief muscle jerks. (Dropping coffee cup in morning).
Atonic: "Drop attacks". Sudden loss of tone. Head injury risk.

4. STATUS EPILEPTICUS PROTOCOL

🚨 **THE KILL SWITCH (0-5 MINS)**
1. ABCs: Airway, Oxygen, Glucose check.
2. Benzodiazepines (First Line):
• IV Lorazepam 4mg (Preferred) OR
• IV Diazepam 10mg OR
• IM Midazolam (if no IV access).

IF SEIZURE CONTINUES (5-20 MINS):
3. Load Anticonvulsant:
• IV Phenytoin / Fosphenytoin OR
• IV Levetiracetam OR
• IV Valproate.

REFRACTORY (> 20 MINS):
4. Anesthesia (ICU): Propofol or Thiopental. Intubate.

5. CLINICAL SCENARIOS (HIGH YIELD)

Q: 18yo male, morning jerks of arms (spills coffee), history of late nights/alcohol. Had a generalized fit today.
Juvenile Myoclonic Epilepsy (JME). Classic triad: Myoclonic jerks + GTCS + Absence. Trigger: Sleep deprivation. Rx: **Valproate** (Life-long).

Q: 6yo child, teacher says he "daydreams" often. Grades dropping. No convulsions.
Absence Seizures. EEG: 3Hz Spike and Wave. Rx: **Ethosuximide**.

Q: 35yo female with epilepsy wants to conceive. Current drug is Valproate.
STOP Valproate. High risk of Neural Tube Defects. Switch to **Lamotrigine** or Levetiracetam. Start Folic Acid 5mg.

Drugs & Syndromes

6. MATCH THE DRUG TO THE SEIZURE

Seizure Type	First Line Drug	Alternative
Focal (Partial)	**Carbamazepine** or Lamotrigine	Levetiracetam
Generalized Tonic-Clonic	**Sodium Valproate**	Lamotrigine / Levetiracetam
Absence	**Ethosuximide**	Valproate
Myoclonic (JME)	**Sodium Valproate**	Levetiracetam

WARNING: Carbamazepine can WORSEN Absence and Myoclonic seizures. Never give it if you aren't sure of the type.

7. DRUG SIDE EFFECTS (EXAM GOLD)

Sodium Valproate:
- Weight gain, Hair loss (Alopecia), Tremor.
- **Teratogenic** (Neural Tube Defects). PCOS
- Hepatotoxicity.

Carbamazepine:
- P450 Inducer (Interacts with everything).
- **Hyponatremia** (SIADH-like effect).
- Agranulocytosis / Rash (SJS).

Phenytoin:
- **Gum Hypertrophy** (Cosmetic issue).
- Hirsutism, Coarse facial features.
- Cerebellar toxicity (Ataxia/Nystagmus).

Lamotrigine:
- **Steven-Johnson Syndrome** (Rash). Start low, go slow.

8. PEDIATRIC SYNDROMES

Q: West Syndrome (Infantile Spasms)?
Infant < 1yr. "Salaam" attacks (sudden flexion).
EEG: **Hypsarrhythmia** (Chaotic).
Rx: **ACTH** (Steroids) or Vigabatrin.

Q: Febrile Convulsions?
6 months to 6 years. Triggered by fever.
- **Simple:** < 15 mins, generalized, once in 24h. Rx: Reassurance.
- **Complex:** > 15 mins, focal, recurrent. High risk of epilepsy.

Q: Benign Rolandic Epilepsy?
Child 5-10y. Face numbness/twitching during sleep. Drooling.
Prognosis: Excellent. Disappears by age 16.

9. ETIOLOGY: "VITAMINS" MNEMONIC

Vascular (Stroke/Bleed).
Infection (Meningitis/Encephalitis/Abscess).
Trauma (Head injury).
Autoimmune (SLE).
Metabolic (**Hypoglycemia**, Low Na, Low Ca, Uremia).
Idiopathic / Iatrogenic (Drugs).
Neoplasm (Tumor).
Structural (Mesial Temporal Sclerosis).

10. FIRST AID FOR SEIZURES

DO:
- Time the seizure.
- Protect head. Recovery position (left lateral) after it stops.

DO NOT:
- Put anything in their mouth (No spoons, no fingers).
- Restrain them.

Headache & Facial Pain

MIGRAINE • CLUSTER • IIH • RED FLAGS **KMU FINAL YEAR**

1. THE RED FLAGS (SNOOP)

🚨 **WHEN TO SCAN?**
Systemic signs (Fever, weight loss).
Neurologic signs (Confusion, weakness).
Onset (Sudden/Thunderclap).
Older age (>50 years new onset).
Progressive / Positional / Pregnancy.
Action: Non-contrast CT Head.

2. MIGRAINE (THE VASCULAR STORM)

Diagnosis: "POUND" (3+ criteria = 90% predictive)
Pulsatile (Throbbing).
One day duration (4-72 hours).
Unilateral.
Nausea / Vomiting.
Disabling intensity.
+ Photophobia & Phonophobia.

Types:
• **Without Aura (Common):** Headache immediately.
• **With Aura (Classic):** Scintillating Scotoma (zigzag lines) or sensory march 20-60 mins *before* pain.

Pathogenesis: Trigeminovascular system activation. Release of CGRP (Calcitonin Gene-Related Peptide) -> Vasodilation.

3. MIGRAINE MANAGEMENT

Phase	Drug of Choice
Acute (Abortive)	1. NSAIDs (Mild). 2. **Triptans** (Sumatriptan) - 5HT Agonist. *Contraindicated in Ischemic Heart Disease.*
Prophylaxis (If >2 attacks/month)	1. **Beta Blockers** (Propranolol). 2. Topiramate (Side effect: Weight loss/Stones). 3. Amitriptyline.

4. TENSION VS CLUSTER (THE DUEL)

Feature	Tension Headache	Cluster Headache
Site	Bilateral ("Band-like")	Unilateral (Orbital/Temporal)
Patient	Female > Male	Male (Smoker)
Features	Non-pulsatile. NO Nausea/Vomiting.	Red eye, Lacrimation, Rhinorrhea, Horner's syndrome.
Behavior	Resting helps.	**Restless** (Pacing around). "Suicide headache".
Rx	NSAIDs / Paracetamol.	Acute: **100% Oxygen** + Sumatriptan (SC). Prevent: **Verapamil**.

5. TRIGEMINAL NEURALGIA

Clinical Features:
• Sudden, severe, **electric-shock** pain.
• Unilateral. V2 (Maxillary) and V3 (Mandibular) distribution.
• **Trigger Zones:** Touching face, chewing, brushing teeth, wind.

Cause: Vascular loop compressing CN V root.
Treatment:
• 1st Line: **Carbamazepine**.
• Surgery: Microvascular Decompression.

6. IDIOPATHIC INTRACRANIAL HTN (IIH)

AKA: Pseudotumor Cerebri.
Typical Patient: "Fat, Female, Forty" (Obese woman of childbearing age).
Features: Morning headache, Diplopia (CN VI Palsy).
Key Sign: Papilledema (Check Fundoscopy!).
Imaging: CT/MRI is NORMAL (Rules out tumor).
Rx: Weight loss, Acetazolamide, LP (therapeutic).

7. TEMPORAL ARTERITIS (GCA)

🚨 **BLINDNESS RISK**
Patient: Elderly (>60).
Signs: Scalp tenderness (combing hair), Jaw Claudication, Tender temporal artery.
Marker: ESR > 50.
Action: Start High Dose Steroids IMMEDIATELY (before biopsy).

Multiple Sclerosis & TM

DEMYELINATION • NMO • MCDONALD CRITERIA **KMU FINAL YEAR**

1. MULTIPLE SCLEROSIS (THE CHAMELEON)

Definition: Autoimmune inflammatory demyelination of the CNS (Brain + Spinal Cord).
The Golden Rule: Lesions must be disseminated in **TIME** (multiple episodes) and **SPACE** (multiple locations).

Clinical Features:
• **Optic Neuritis:** Painful vision loss, washed out colors (Red desaturation).
• **INO (Internuclear Ophthalmoplegia):** "Lazy eye" on lateral gaze. (Lesion in MLF).
• **Lhermitte's Sign:** Electric shock sensation down spine on neck flexion.
• **Uhthoff's Phenomenon:** Symptoms worsen with HEAT (Hot bath/Exercise).

2. DIAGNOSIS (MCDONALD CRITERIA)

1. MRI Brain/Spine (Best Test):
• **Periventricular Plaques** (Dawson's Fingers).
• Juxtacortical / Infratentorial lesions.
• Contrast enhancement = Active (New) lesion.

2. CSF Analysis (Supportive):
• **Oligoclonal Bands** (IgG) - Positive in 95%.
• Note: Must be present in CSF but NOT in serum.

3. VEP (Visual Evoked Potentials):
• Delayed conduction (P100 latency) due to demyelination.

3. TRANSVERSE MYELITIS

What is it? Inflammation across the *entire width* of the spinal cord at one level.
Presentation: Rapid onset paraplegia + **Distinct Sensory Level** + Bladder retention.
Causes: Post-viral, MS (first attack), NMO.
Rx: High dose steroids.

4. CLINICAL SCENARIOS (HIGH YIELD)

Q: 25F, blurry vision in left eye 1 year ago. Now presents with right leg weakness and urgency. Reflexes brisk. Diagnosis?
Multiple Sclerosis. (Time: 1 year gap. Space: Eye + Leg/Cord).

Q: 45F, progressive leg weakness and sensory loss. MRI shows longitudinally extensive lesion (>3 segments). Antibody?
Anti-Aquaporin 4. Diagnosis: **Neuromyelitis Optica (NMO)** / Devic's Disease.

Q: Pregnant patient with MS. Asks about relapse risk?
Relapse risk **decreases** during pregnancy (protective) but **increases** postpartum.

Q: Patient with MS complains of severe fatigue affecting daily life. Drug of choice?
Modafinil or **Amantadine**.

5. MANAGEMENT STRATEGY

Phase	Treatment
Acute Relapse	**IV Methylprednisolone** (1g for 3-5 days). *Shortens attack, doesn't change long-term outcome.*
Maintenance (RRMS)	• Interferon Beta / Glatiramer. • Natalizumab (Risk: PML virus). • Fingolimod (Oral).
Primary Progressive	**Ocrelizumab** (Anti-CD20). The only drug approved for PPMS.
Symptomatic	• Spasticity: Baclofen / Gabapentin. • Bladder: Oxybutynin. • Tremor: Beta-blockers.

6. NMO VS MS (THE TRAP)

🚨 **DON'T CONFUSE THEM**
Neuromyelitis Optica (Devic's):
• Target: Optic Nerves + Spinal Cord ONLY.
• Brain: Usually normal.
• MRI Spine: Long lesion (>3 vertebral segments).
• Marker: Anti-NMO (Aquaporin-4).
• Rx: Steroids/Plasma Exchange. (MS drugs can worsen NMO!).

Dementia & Cognitive Disorders

ALZHEIMER'S • LEWY BODY • VASCULAR • CJD **KMU FINAL YEAR NEUROSCIENCES**

1. ALZHEIMER'S DISEASE (THE BIG ONE)

Mechanism: Extracellular Beta-Amyloid Plaques + Intracellular Tau Tangles (Neurofibrillary).
Location: Hippocampus (Memory) -> Temporal -> Parietal.
Genetics: ApoE4 (Late onset risk), Presenilin 1/2 (Early onset).

Clinical Features:
- Short-term memory loss (first sign).
- Anosognosia (Unaware of illness).
- Apraxia (difficulty with tasks) / Aphasia later.

2. VASCULAR DEMENTIA

The "Step-Wise" Decline:
- Patient is stable -> Stroke/TIA -> Sudden drop in function -> Stable -> Drop.
- **Risk Factors:** HTN, Diabetes, Smoking, AFib.
- **Imaging:** Multiple lacunar infarcts or extensive white matter changes.
- **Exam:** Focal signs (e.g., hemiparesis, brisk reflexes) often present.

3. DEMENTIA WITH LEWY BODIES (DLB)

The Triad of DLB:
1. **Visual Hallucinations** (Seeing little people/animals).
2. **Parkinsonism** (Rigidity/Tremor).
3. **Fluctuating Cognition** (Good days and bad days).

Note: Sensitivity to Antipsychotics (Neuroleptic Malignant Syndrome risk).

4. FRONTOTEMPORAL DEMENTIA (PICK'S)

Pathology: Pick Bodies (Tau proteins). Frontal/Temporal atrophy.
Age: Younger onset (50-60s).

Clinical Variants:
1. **Behavioral:** Disinhibition (rudeness), sexual inappropriateness, apathy, sweet tooth. *Personality goes first, memory later.*
2. **Primary Progressive Aphasia:** Loss of language output first.

5. NORMAL PRESSURE HYDROCEPHALUS (NPH)

THE TREATABLE TRIAD
"Wet, Wobbly, and Wacky"
1. Wet: Urinary Incontinence (early sign).
2. Wobbly: Magnetic Gait (feet stuck to floor).
3. Wacky: Dementia (reversible).

Diagnosis: MRI (Large ventricles).
Treatment: VP Shunt (Ventriculoperitoneal).

6. CREUTZFELDT-JAKOB DISEASE (CJD)

Prion Disease: Rapidly progressive. Death within 1 year.
Key Signs:
- Rapid Dementia (weeks/months).
- **Startle Myoclonus** (Jerks on loud noises).
- EEG: Periodic Sharp Wave Complexes.
- CSF: **14-3-3 Protein** positive.
- MRI: "Hockey Stick" sign in basal ganglia.

7. MANAGEMENT CHEAT SHEET

Disease	First Line Treatment
Alzheimer's	**Cholinesterase Inhibitors:** Donepezil, Rivastigmine, Galantamine. **NMDA Antagonist:** Memantine (Severe cases).
Vascular	Control Risk Factors (BP, Statins, Aspirin). No specific dementia drug works well.
Lewy Body	Donepezil (for cognition). Levodopa (for motor - caution: worsens hallucinations).
FTD	Symptomatic (SSRI for behavior). **No specific cure.**

8. CLINICAL SCENARIOS (HIGH YIELD)

Q: 75M, seeing children in the room who aren't there. Falls often. Stiff limbs. Diagnosis?
Lewy Body Dementia. (Hallucinations + Parkinsonism).

Q: 55M, arrested for shoplifting sweets. Used to be a polite teacher. Memory is okay.
Frontotemporal Dementia. (Disinhibition + Dietary changes + Young age).

Q: 68M, difficulty walking (wide-based), wet himself today. Forgetful.
Normal Pressure Hydrocephalus. (Wet, Wobbly, Wacky). Treat with Shunt.

Movement Disorders: Hypokinetic

PARKINSON'S • TREMORS • DRUGS • MANAGEMENT **KMU FINAL YEAR**

1. TREMOR CLASSIFICATION (R-E-I)

1. Resting Tremor:
• "Pill-Rolling" (4-6 Hz). Happens at rest.
• Diagnosis: **Parkinson's Disease.**

2. Essential (Postural) Tremor:
• When holding posture (arms out).
• **Better with Alcohol.** Family Hx ++.
• Rx: **Propranolol** (Beta-blocker).

3. Intention (Action) Tremor:
• Worsens near target (Finger-Nose test).
• Diagnosis: **Cerebellar Lesion.**

2. PARKINSON'S DISEASE (PD)

The "TRAP" Features:
• **T**remor (Resting, asymmetrical start).
• **R**igidity (Lead pipe or Cogwheel).
• **A**kinesia (Bradykinesia - Mask face, micrographia).
• **P**ostural Instability (Late falls).

Pathology: Loss of Dopamine in **Substantia Nigra**.
Histology: Lewy Bodies (Alpha-synuclein).

3. DRUG INDUCED (RED FLAG)

🚨 **ELDERLY + RIGIDITY?**
Check the drug chart!
Culprits: Haloperidol, Metoclopramide, Prochlorperazine.
Action: Stop drug. Do NOT start Levodopa yet.

4. PD PHARMACOLOGY (THE MENU)

Drug Class	Use Case & Notes
Levodopa + Carbidopa	**Gold Standard.** Best for motor signs (Bradykinesia). Carbidopa stops peripheral breakdown.
Dopamine Agonists	**Ropinirole / Pramipexole.** 1st line for **Young (<65)** to save Levodopa for later. Risk: Gambling/Impulse control.
MAO-B Inhibitors	**Selegiline.** Stops breakdown. Mild effect.
COMT Inhibitors	**Entacapone.** Extends Levodopa half-life.
Anticholinergics	**Procyclidine.** For Tremor ONLY. Avoid in elderly (Confusion/Retention).

5. COMPLICATIONS & SCENARIOS

On-Off Phenomenon: Sudden freezing vs mobility.
Dyskinesia: Excess writhing movement (Peak dose).
Wearing Off: Drug fails before next dose.

Q: 70M, Tremor + Rigidity. Given Haloperidol for agitation. Next day frozen stiff.
Worsening Parkinsonism due to D2 blockade. Stop Haloperidol. Use Quetiapine.

Q: Young PD patient starts gambling savings away.
Dopamine Agonist side effect (Impulse control disorder). Switch drug.

Hyperkinetic & Imposters

CHOREA • DYSTONIA • WILSON'S • CEREBELLUM **KMU FINAL YEAR**

6. PARKINSON PLUS (THE IMPOSTERS)

"Looks like PD, but Levodopa fails."

1. Progressive Supranuclear Palsy (PSP):
- **Vertical Gaze Palsy** (Can't look down).
- Early falls (Backwards).

2. Multiple System Atrophy (MSA):
- **Autonomic Failure:** Postural hypotension, incontinence.
- Cerebellar signs.

3. Lewy Body Dementia (LBD):
- **Visual Hallucinations** + Parkinsonism.

7. HUNTINGTON'S DISEASE

Genetics: Autosomal Dominant. Ch 4. **CAG Repeats**.
Anticipation: Worse in next gen (Father).
The Triad:
1. **Chorea** (Dance-like movements).
2. **Dementia**.
3. **Psychiatry** (Depression/Aggression).

MRI: Boxcar Ventricles (Caudate atrophy).

8. DYSTONIA

Acute Dystonia:
- Sudden spasm (Torticollis, Oculogyric crisis).
- Cause: Anti-emetics / Antipsychotics.
- Rx: **Procyclidine** IV.

Tardive Dyskinesia:
- Chronic lip smacking/chewing.
- Often permanent. Stop drug.

9. WILSON'S DISEASE

YOUNG + NEURO + LIVER
Pathology: Copper overload (Auto Recessive).
Presentation:
• Liver: Cirrhosis/Hepatitis in child.
• Neuro: Wing-beating tremor, Dysarthria, Psychosis.
Signs: Kayser-Fleischer Rings (Cornea).
Dx: Low Ceruloplasmin, High Urine Copper.
Rx: Penicillamine (Chelator).

10. CEREBELLAR SYNDROME

"DANISH"
- **D**ysdiadochokinesia.
- **A**taxia (Broad gait).
- **N**ystagmus.
- **I**ntention Tremor.
- **S**lurred Speech (Staccato).
- **H**ypotonia.

Cause: Alcohol (Vermis), Stroke, MS.

11. HEMIBALLISMUS

Feature: Violent, flinging of one arm/leg.
Lesion: Contralateral **Subthalamic Nucleus**.
Cause: Lacunar Stroke.

12. CLINICAL SCENARIO

Q: 55M, falls backward often, can't look down to read book. Rigid.
PSP (Progressive Supranuclear Palsy). Vertical gaze palsy is pathognomonic.

Meningitis & Encephalitis

CSF ANALYSIS • ORGANISMS • CLINICAL SIGNS **KMU FINAL YEAR**

1. BACTERIAL MENINGITIS ORGANISMS

Neonates (< 3 months): "BEL"
- **B** Group Strep (Most Common).
- **E**. Coli.
- **L**isteria monocytogenes.

Children & Adults:
- **Neisseria meningitidis** (Meningococcus) - Rash!
- **Streptococcus pneumoniae** (Pneumococcus).
- *Haemophilus influenzae (rare now due to vaccine).*

Elderly (> 60) / Immunocompromised:
- Strep Pneumo + **Listeria**.

2. CLINICAL SIGNS (THE TRIAD)

Classic Triad: Fever + Headache + Neck Stiffness.
Photophobia / Phonophobia.

Physical Signs:
- **Kernig's Sign:** Pain on extending knee with hip flexed.
- **Brudzinski's Sign:** Neck flexion causes hip/knee flexion.
- **Rash:** Non-blanching petechiae/purpura (Meningococcal).

3. SPECIAL: TB MENINGITIS

Pathology: Basal Meningitis (Exudates at base of brain).
Key Features:
- Subacute onset (weeks).
- **Cranial Nerve Palsies** (III, IV, VI) due to basal exudates.
- Hydrocephalus.
- CSF: **Cobweb Clot** on standing.

4. CSF ANALYSIS (THE GOLD STANDARD)

Type	Cells	Glucose	Protein
Bacterial	**Neutrophils** (High >1000)	**Low** (Bacteria eat it)	**High** (>100 mg/dl)
Viral (Aseptic)	**Lymphocytes** (10-1000)	**Normal**	Normal / Mild High
TB	**Lymphocytes**	**Very Low** (< 1/3 serum)	**Very High** (> 1g/L)
Fungal	Lymphocytes	Low	High

🚨 **WHEN TO CT BEFORE LP?**
Do NOT stick a needle in if ICP is raised (risk of coning).
Signs: Papilledema, Focal Neuro Deficit, Seizures, GCS < 12.
If present -> CT First -> Then LP. Start Antibiotics immediately!

5. INVESTIGATION FLOW

1. **Blood Cultures** (Immediately).
2. **Empiric Antibiotics** (Don't wait for scan/LP).
3. **CT Head** (If red flags present).
4. **Lumbar Puncture** (CSF Microscopy, Culture, PCR, Latex agglutination).

Management & Encephalitis

ANTIBIOTICS • PROPHYLAXIS • HSV • ACYCLOVIR **KMU FINAL YEAR**

6. EMPIRIC MANAGEMENT

Patient Group	Antibiotic Regimen
Neonates	Ampicillin + Cefotaxime (or Gentamicin). *(Ampicillin covers Listeria).*
Children / Adults	**Ceftriaxone** (2g IV BD) + Vancomycin. *(Ceftriaxone covers Meningo/Pneumo).*
> 55y / Immunocomp	Ceftriaxone + Vancomycin + **Ampicillin**. *(Listeria risk returns).*

Role of Steroids (Dexamethasone):
• Give **BEFORE** or with first dose of antibiotics.
• Reduces hearing loss and neurological sequelae (esp in Strep Pneumo).
• *Do not give if septic shock or meningococcal rash.*

7. PROPHYLAXIS (CONTACTS)

Who? Close contacts (kissing, household) of **Meningococcal** meningitis.
Drug of Choice:
• **Ciprofloxacin** (Single dose PO) OR
• **Rifampicin** (2 days PO) OR
• Ceftriaxone (IM - Pregnancy choice).
Note: Pneumococcal meningitis does NOT require prophylaxis.

8. COMPLICATIONS

Immediate: Septic Shock (Waterhouse-Friderichsen - adrenal hemorrhage), Seizures, Cerebral Edema.
Delayed:
• Sensorineural Hearing Loss (Commonest).
• Hydrocephalus.
• Subdural Effusion (in infants).

9. VIRAL ENCEPHALITIS

Definition: Infection of the brain parenchyma (unlike meningitis = coverings).
Most Common Cause: Herpes Simplex Virus 1 (HSV-1).
Other Causes: Arboviruses, Rabies, CMV (HIV), Measles (SSPE).

10. HSV ENCEPHALITIS (HIGH YIELD)

🚨 **THE TEMPORAL LOBE EATER**
Clinical Features:
• Fever + Headache + Behavioral Changes (Psychosis/Confusion).
• Seizures (Focal).
• Olfactory Hallucinations (Temporal lobe).

Diagnosis:
• CSF PCR for HSV (Gold Standard).
• MRI: Hyperintensity in Temporal Lobes.
• EEG: PLEDs (Periodic Lateralized Epileptiform Discharges).

11. MANAGEMENT OF ENCEPHALITIS

Drug of Choice: IV Acyclovir (10mg/kg TDS).
• **Start Empirical:** If suspected, start Acyclovir immediately. Do not wait for PCR.
• **Duration:** 14-21 days.
• **Side Effect:** Renal toxicity (Crystal nephropathy) - Ensure hydration!

12. CLINICAL SCENARIOS

Q: 20M, fever, severe headache, petechial rash on legs. BP 90/60. Next step?
IV Benzylpenicillin or Ceftriaxone IMMEDIATELY. Do not CT. Do not LP yet. Treat Sepsis.

Q: 45F, fever, confusion, smelling "burnt rubber". MRI shows temporal lobe swelling.
HSV Encephalitis. Treat with Acyclovir.