

Medications & Management plan – Neurology Mini-OSCE

Epilepsy:

Absence seizures: ethosuximide, sodium valproate

- Do Not use phenytoin or carbamazepine because they worsen the absence seizure

AED medications and their MOA:

- **Phenytoin** Na⁺ channel blocker + Glutamate receptor antagonism
- **Valproate**: Na⁺ channel blocker + GABA receptor enhancement + Ca²⁺ channel blocker
- **Carbamazepine**: Na⁺ channel blocker + GABA receptor enhancement
- **Lamotrigine**: Na⁺ channel blocker + H-current enhancement + Glutamate receptor antagonism

Status epilepticus treatment algorithm:

- 1- Check emergency ABC's, Give **O₂**, Obtain IV access, Begin EKG monitoring, Check fingerstick glucose, Draw blood for Chem-7, Magnesium, Calcium, Phosphate, CBC, LFTs, AED levels, ABG, troponin, Toxicology screen (urine and blood), **Thiamine 100 mg IV; 50 ml of D50 IV** unless adequate glucose known.
- 2- First line treatment (within 5-10 minutes):
 - A- **Lorazepam** (IV): 0.1 mg/kg – Maximum dose: 4 mg @ 2min, could be repeated in 5-10 minutes
 - B- **Midazolam** (IM, Buccal, Nasal): 0.2 mg/kg, Maximum dose: 10mg
 - C- **Diazepam** (PR): 0.2 mg/kg, Maximum dose: 20 mg
- 3- Second line treatment (within 10-30 minutes):
 - A- Phenytoin (15-20 mg/kg)
 - B- Valproate (20-30 mg/kg)
 - C- Levetiracetam (30-70 mg/kg)
 - D- Phenobarbital (20 mg/kg)
- 4- Stage 3: General anesthesia (propofol + intubate the patient)

Headache:

Tension headache:

- 1- Abortive treatment: NSAID's, Acetaminophen, Aspirin
- 2- Prophylaxis:
 - A- First line: Antidepressant (tricyclic amitriptyline)
 - B- Second line: Mirtazapine & Venlafaxine
 - C- Muscle relaxants such as tizanidine are helpful sometimes, particularly in patients with a cervicogenic component
- 3- Adjuvant treatment: Biofeedback

Migraine:

- 1- Acute treatment: Oral triptan + NSAID's, or
Oral triptan + Paracetamol
 - *if the patient is 12-17 years old, use nasal triptans instead of oral.
 - *Triptans are currently not known to be safe in pregnancy and have a cardiovascular risk
 - *Triptans also interact with selective serotonin reuptake inhibitors and serotonin-norepinephrine reuptake inhibitors, with a low risk of serotonin syndrome
- 2- If the above measures are not effective or not tolerated offer a non-oral preparation of metoclopramide or prochlorperazine and consider adding a non-oral NSAID or triptan (Caution should be exercised when prescribing metoclopramide to young patients as acute dystonic reactions may develop)
- 3- Prophylaxis: Propranolol, Amitriptyline, Topiramate, Botulinum toxin injection, Monoclonal antibodies directed against the calcitonin gene-related peptide (CGRP) receptor: erenumab
 - *Topiramate may be teratogenic and it can reduce the effectiveness of hormonal contraceptives
 - *For women with predictable menstrual migraine treatment NICE recommend either frovatriptan (2.5 mg twice a day) or zolmitriptan (2.5 mg twice or three times a day) as a type of 'mini-prophylaxis'
- 4- Lifestyle modifications: A comorbid sleep disorder (insomnia, obstructive sleep apnea ...) makes patients more susceptible to migraine, skipping meals, insufficient fluid, excessive caffeine intake, and lack of exercise make susceptible patients more prone to migraine attacks
 - *Patients should be counseled on these factors

Cluster headaches:

- 1- Acute management:
 - A- 100% [oxygen](#) (80% response rate within 15 minutes)
 - B- Subcutaneous [triptan](#) (75% response rate within 15 minutes)
- 2- Prophylaxis:

[Verapamil](#) is the drug of choice

There is also some evidence to support a tapering dose of [prednisolone](#)

Trigeminal Neuralgia: [Carbamazepine](#)

Idiopathic Intracranial Hypertension: [Acetazolamide](#)

Movement Disorders:

Essential tremors: [propranolol](#) and [primidone](#), DBS (Vim nucleus of thalamus) for severe cases.

Parkinson's disease: Treatment of motor symptoms:

- 1- [Levodopa + Carbidopa](#) (First-line treatment)
- 2- MAO-B inhibitors
- 3- Anticholinergics: [trihexyphenidyl](#)
- 4- Dopamine agonists (non-ergot + ergot)
- 5- NMDA antagonists: [Amantadine](#)

Treatment of Alzheimer's Disease:

- 1- (Symptomatic therapy): [Cholinesterase Inhibitors](#)
- 2- Disease modifying therapy: New Monoclonal Anti-Amyloid Therapies

Multiple Sclerosis:

- 1- Treatment of relapses:
 - A- High-dose steroids - IV/oral [Methylprednisolone](#) 1 g daily for 3-5 days
 - B- [ACTH](#) gel (IM or SC): 80 u daily for 5-15 days– more potent immunomodulatory effect but expensive and not available.
 - C- [Plasma exchange for refractory relapses](#)
 - D- IV Immunoglobulins (?)
- 2- Prevention of relapses /disability (Disease-Modifying Therapy)

- 3- Symptomatic treatment.
- 4- Rehabilitation
- 5- Lifestyle modification (stop smoking....)

Neurological Emergencies:

1. Coma Management

- Initial steps (First Hour Management):
 - Improve oxygenation (face mask, 10L/min oxygen flow, target saturation >95%).
 - Intubate if:
 - A- The patient cannot protect the airway.
 - B- There is an irregular, ineffective respiratory drive.
 - C- Major facial injury is present (consider emergency tracheostomy).
 - Emergency treatments:
 - A- Administer 50 ml of 50% glucose if hypoglycemia is suspected.
 - B- Administer 100 mg [thiamine IV with glucose](#).
 - C- Administer [naloxone](#) if opioid intoxication is suspected.
 - D- [Flumazenil](#) for benzodiazepine toxicity.
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2. Acute Bacterial Meningitis (ABM)

- Empirical Treatment:
 - 1- Ceftriaxone (2g every 12 hours IV) OR Cefotaxime (8–12 g/day in divided doses every 6 hours IV).
 - 2- +/- Vancomycin (2g/day in divided doses every 12 hours IV).
 - 3- Add Ampicillin (12g/day in divided doses every 4 hours IV) +/- Gentamicin if [Listeria](#) is suspected (age >55, immunosuppressed).
 - 4- Dexamethasone IV (10 mg every 6 hours for 4 days) if [pneumococcal meningitis](#) is suspected.

- CSF Analysis for Confirmation:
 - 1- Increased Pressure, Turbid Appearance.
 - 2- Increased WBCs (mostly polymorphs).
 - 3- Increased protein.
 - 4- Low glucose (<40% of blood sugar).
 - 5- Increased lactate (>2.4 mmol/L).
 - 6- Gram stain, culture, PCR.
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3. Viral Meningitis

- Management:
 - Usually **self-limiting**.
 - **Supportive** care (fluids, pain relief).
 - If HSV suspected, **Acyclovir** 10 mg/kg IV every 8 hours.
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4. Herpes Simplex Virus (HSV) Encephalitis

- Treatment:
 - IV **Acyclovir** 10 mg/kg every 8 hours.
 - Start early, even if PCR is negative initially (repeat PCR in 24-72 hours).
 - MRI findings:
 - Asymmetric but usually bilateral abnormalities in the limbic system, medial temporal lobes, insular cortices, and inferolateral frontal lobes.
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5. Brain Abscess

- Management:
 - Empirical IV **antibiotics** (based on suspected organisms).
 - **Surgical drainage** if large or causing significant mass effect.
 - MRI or CT imaging to monitor progress.
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6. Guillain-Barré Syndrome (GBS)

- Immunotherapy:
 - IV [Immunoglobulin](#) (0.4 g/kg daily for 5 days).
 - OR [Plasma exchange](#) (4-5 sessions).
 - Supportive Care:
 - Monitor vital capacity (VC) – Intubate if VC <15 ml/kg.
 - 25% require ventilatory support.
 - Cardiac monitoring for arrhythmias.
 - Venous thromboembolism prophylaxis (compression stockings, low molecular weight heparin).
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7. Myasthenia Gravis (MG)

- Investigations:
 - Edrophonium (Tensilon) Test
 - The orbital Ice Test
 - Autoantibodies
 - [AChR antibodies](#), detectable in 85% - 90% of generalized MG and 50% of ocular MG. Its level correlates with disease status in the individual patient
 - [Anti-MuSK](#) antibodies
 - Antibodies to muscle antigens ([anti-striational](#))
 - Electrophysiological tests
 - Repetitive Nerve Stimulation
 - Single Fiber EMG
 - CT scan of the chest
 - Search for other autoimmune diseases: thyroid disease, B12 deficiency, collagen vascular disease
- Myasthenic Crisis Treatment:
 - IV [Immunoglobulin](#) (IVIg) OR [Plasma Exchange](#) (PE).

- Long-Term Treatment:
 - Oral steroids & immunosuppressives.
 - [Acetylcholinesterase inhibitors](#).
 - [Thymectomy](#) (in thymoma cases).
 - New monoclonal therapies (e.g., [Rituximab](#)).
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8. Subarachnoid Hemorrhage (SAH)

- Acute Management:
 - Blood pressure control.
 - Prevent vasospasm ([Nimodipine](#)).
 - Neurosurgical intervention if aneurysm detected.
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9. Cerebral Venous Thrombosis (CVT)

- [Anticoagulation therapy](#) (Heparin, Warfarin).
- MRI/MRV for diagnosis.

10. Wernicke's Encephalopathy

- Urgent Treatment:
 - IV [Thiamine](#) (Vitamin B1) replacement.
 - Delay in treatment can lead to Korsakoff's psychosis or death.

Stroke:

1. Management of Ischemic Strokes

- General supportive care:
 - Maintain blood glucose, hydration, oxygen saturation, and temperature within normal limits.
 - Blood pressure control: Should not be lowered in the acute phase unless complications arise (e.g., hypertensive encephalopathy).

- Aspirin 300 mg orally or rectally should be given as soon as possible if hemorrhagic stroke is excluded.
 - **Thrombolysis (Alteplase IV): Only if brain hemorrhage has been definitively excluded**
 - Within 4.5 hours of onset.
 - **BP must be lowered to <185/110 mmHg before treatment.**
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2. Contraindications for Thrombolysis

- Symptoms suggestive of subarachnoid hemorrhage (SAH) even if the CT is normal.
 - Large aneurysm (>10 mm) or ruptured aneurysm.
 - Use of therapeutic-dose low-molecular-weight heparin (LMWH) in the past 24 hours.
 - Suspected aortic dissection.
 - CT hypodensity >1/3 MCA territory.
 - Major surgery in the past 14 days.
 - Moyamoya disease.
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3. Thrombectomy for Acute Ischemic Strokes

- Indications (within 6 hours of symptom onset):
 - Confirmed occlusion of the proximal anterior circulation (MCA, ICA) on CTA or MRA.
 - Within 24 hours if wake-up stroke and evidence of salvageable brain tissue on CT perfusion or diffusion-weighted MRI.
 - Consider thrombectomy with thrombolysis (if within 4.5 hours) for proximal posterior circulation occlusions (basilar/posterior cerebral artery).
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4. Secondary Prevention of Ischemic Strokes

- Carotid Endarterectomy:
 - Recommended if stroke or TIA in carotid territory and not severely disabled.
 - Should be done if carotid stenosis is >70% (ECST criteria) or >50% (NASCET criteria).

- Dual Antiplatelet Therapy (DAPT):
 - **Clopidogrel** loading dose within the first 24 hours for high-risk TIA or low NIHSS stroke.
 - **DAPT** (Aspirin + Clopidogrel) for 21 days.
 - Statins for patients with high lipid profiles.
 - Oral anticoagulants for ischemic stroke or TIA with atrial fibrillation.
 - In intracranial atherosclerosis, DAPT for 3 months, then single antiplatelet therapy.
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5. Hemorrhagic Strokes

- Intracerebral hemorrhage (ICH), Subarachnoid hemorrhage (SAH), Epidural and subdural hemorrhages (mostly traumatic)
 - **Management of SAH:**
 - Prevent rebleeding and vasoconstriction.
 - Surgical **clipping or coiling of aneurysms**.
 - **Nimodipine** (calcium channel blocker) minimizes vasoconstriction and delayed ischemia.
 - **BP control (<140/90 mmHg).**
 - Management of ICH:
 - Correct any coagulopathy.
 - Surgical decompression for cerebellar hemorrhages or high herniation risk.
 - BP controls to prevent recurrence.
 - Stabilization and supportive care.
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6. Vascular Malformations and Stroke Risk

- Arteriovenous Malformations (AVMs)
 - Risk of bleeding or seizures.
 - Treatment: embolization or surgical resection.
- Cavernous Angiomas

- It can cause seizures but rarely bleed. Use antiseizure medications if seizures occur.
 - Surgery only if recurrent bleeding.
- Developmental Venous Anomalies (DVAs): Rarely require treatment.
- Telangiectasias: No treatment required (incidental findings on imaging).