



# Neurological Disorders For MO

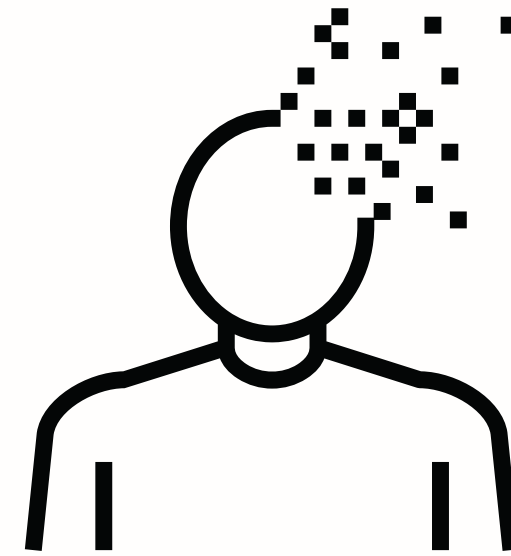


# NEUROLOGICAL DISORDERS

Neurological disorders are caused as a result of structural, biochemical or electrical abnormalities in the brain

**The following disorders will be discussed**

- Epilepsy
- Dementia
- Alzheimer's disease





# EPILEPSY

- Epilepsy is a disease where a person tends to have recurrent seizures. Seizures are caused by abnormal nerve signals in the brain and can cause a variety of symptoms. According to the International league against epilepsy (ILAE), epilepsy is a disorder of the brain defined by any of the following conditions:
- At least two unprovoked (or reflex) seizures occur more than 24 hours apart.
- One unprovoked (or reflex) seizure and a probability of further seizures similar to the general recurrence risk (at least 60%) after two unprovoked seizures occur over the next 10 years.
- Diagnosis of epilepsy syndrome.



# TYPES

- **Generalized seizures** – that affect both sides of the brain. These occur without warning and hence are commonly associated with injuries.
- **Tonic-clonic seizures**- The patient can have sudden onset jerking/shaking with stiffness/ tightening of the whole body, which can be associated with
  - Cry out.
  - Loss of consciousness.
  - Fall to the ground.
  - Passage of urine or stools.
  - Tongue bite
  - Excessive salivation from mouth





- Up rolling of eyes
  - Pale skin colour
  - Difficult breathing
- 
- The person may feel tired, confused, or sleepy and may have headaches after a generalized tonic-clonic seizure. This state is called 'post-ictal' (after-seizure) state. They may or may not remember the seizure afterward.



1. **Generalized seizures** – that affect both sides of the brain. These occur without warning and hence are commonly associated with injuries.

a) **Tonic-clonic seizures**- The patient can have sudden onset jerking/shaking with stiffness/ tightening of the whole body, which can be associated with

b) **Tonic seizures**: In a tonic seizure, the patient's body may suddenly become stiff. If they are standing, they often fall and develop injuries.

c) **Atonic seizures**: In an atonic seizure (or 'drop attack'), the patient's muscles suddenly relax and become floppy. If they are standing, they often fall, usually forwards, and may injure the front of their head or face.



d) **Myoclonic seizures:** Myoclonic means 'muscle jerk'. Myoclonic seizures are brief but can happen in clusters (many happening close together in time), and often happen shortly after waking. These are the prominent seizure types in "juvenile myoclonic epilepsy." Muscle jerks are not always due to epilepsy (for example, some people have them as they fall asleep)

e) **Absence seizures:** This is generally seen in children and young adults. The patient can have rapid blinking of eyes; the patient may seem confused or look like they are staring at something that is not there.





2. **Focal seizures:** In this type of seizure, abnormal activity starts in just one area of the brain. In this type of seizure, there can be:

- muscle twitching, or abnormal jerking of one limb
- abnormal sensation over some part of the body
- the feeling of strange taste or smell.

Patients with focal seizures may become confused or be unable to respond to questions for up to a few minutes. The focal seizure begins in one part of the brain but can spread to both sides of the brain. In such cases, the person first has a focal seizure that is followed by a generalized seizure.





Some people experience strange sensations before a seizure known as aura.

The aura can be:

- 'Rising' feeling in the stomach or
- Déjà vu (feeling like you have 'been here before)
- Getting an unusual smell or taste;
- A sudden intense feeling of fear or joy;
- A strange feeling like a 'wave' going through the head;
- A sensation that an arm or leg feels bigger or smaller than it is; or
- Visual disturbances such as colored or flashing lights
- Hallucinations (seeing something that is not there).
- Once the patient starts recognizing the aura, they can identify it as a warning they get before seizure occurrence.





# ETIOLOGY

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## What are the causes of epilepsy?

Epilepsy can occur due to many causes that lead to brain damage. In 60- 70% of cases, no cause is found.

The causes may be different for different age groups. These include:

- Difficult birth causing low oxygen supply to the brain of the newborn.
- Head injuries
- Brain tumors
- Genetic conditions where other family members can also be affected. Eg. Tuberous sclerosis.
- Brain infections
- Stroke

# ETIOLOGY

**What can precipitate seizures in epilepsy patients who are already on treatment?**

- Missing medication doses.
- Lack of sleep (a common cause of seizures in patients with juvenile myoclonic epilepsy)
- Fever
- Intake of other drugs that cause seizures
- Heavy alcohol intake



# INVESTIGATIONS

Patients with epilepsy may have to undergo a variety of investigations.  
These include:

- Computed tomography (CT) scan or Magnetic resonance imaging (MRI) scan- The images can help identify tumors, strokes, or abnormalities in brain structure.
- An electroencephalograph (EEG) records the electrical activity in the brain. It helps confirm seizure activity, determine the type of seizure, and identify the part of the brain involved in it.
- Video recording may be used with EEG to record the seizure.
- Blood investigations may also be required.



# WHEN TO REFER A PATIENT WITH EPILEPSY TO A HIGHER CENTER?

Patients with epilepsy can generally be managed well at primary care facilities. However, in the circumstances discussed below, patient should be referred to a higher centre

- The epilepsy is not controlled with medication within 2 years despite good compliance.
- Management is unsuccessful after two drugs are given inadequate doses.
- Patients with epilepsy experience unacceptable immediate or long-term side-effects from medication.



- There is a unilateral structural lesion on CT or MRI brain.
- There is psychological and/or psychiatric co-morbidity.
- Seizures are associated with other symptoms like declining school performance, behavioral disturbances, difficulty in walking, frequent falls, visual disturbances, etc.
- Patients with a strong family history of seizures.





# MANAGEMENT

Although seizures can be frightening to see, they are not usually a medical emergency. Usually, the seizures are self-limiting and stop within 1 to 2 minutes. Once the seizure stops, the person recovers and goes back to normal after some time.

## Pharmacotherapy

- There are multiple drugs known as antiepileptic drugs that can be used to treat epilepsy.
- However, 30% of patients are not controlled with medications. These patients can have drug-refractory epilepsy.

## What is the duration of treatment

- In patients with epilepsy, discontinuation of antiepileptic treatment can be considered after two to three seizure-free years.
- However, the duration of treatment is individualized and depends on many factors like cause of epilepsy, seizure type, patient's occupation.

## Surgery

- Brain surgery can be done in some eligible patients with drug-refractory epilepsy. Medications are mostly continued even after surgery.



# NON-PHARMACOLOGICAL INTERVENTION

All non-pharmacological interventions are used in addition to pharmacological therapy. These include:

- **Diet therapy:** The ketogenic diet and modified Atkin's diet are usually used in patients with drug-resistant epilepsy. The ketogenic diet is a high-fat, low-carbohydrate diet that is typically implemented with a 3:1 or 4:1 fat to carbohydrate/protein ratio by weight. Modified Atkin's diet focuses more on carbohydrate restriction. Patients limit their daily intake of net carbohydrates to 10 to 20 grams per day indefinitely. Fat to protein and carbohydrate ratios is closer to 1:1.



# DOSE AND SIDE EFFECTS OF THE COMMON DRUGS USED IN MANAGEMENT OF EPILEPSY

Medication	Dose	Common side-effects
Phenytoin	5 mg per kg	Sleepiness, swollen gums, rash, Poor coordination or balance.
Carbamazepine	10-20 mg per kg	Sleepiness, rash, poor coordination or balance, double vision, decreased blood cell count, decreased sodium level in blood.
Valproate	20-40mg/kg	Sleepiness, weight gain, hair loss, decreased blood cell counts, birth defects in the newborn of a pregnant women patient taking valproate





Medication	Dose	Common side-effects
Lamotrigine	5 mg/kg (Use half of this dose with slow titration if patient is on valproate)  Very slow up titration not more than 25 mg per week increase	Rash
Clobazam	0.2 to 0.5 mg per kg	Sleepiness
Levetiracetam	10-40 mg/kg	Mood and behaviour changes



- **Alternative therapies:** Yoga, exercise, music therapy have been tried in patients with epilepsy. Though these can be advised to patients with epilepsy, these cannot be relied upon for epilepsy control.



# GENERAL PRECAUTIONS TO PREVENT INJURIES

## General precautions to prevent seizures:

- a) Do not skip medications
- b) Adequate sleep for at least 8 hours
- c) Early treatment of fever







# GENERAL PRECAUTIONS TO PREVENT INJURIES

## Precautions to prevent seizure-related injuries

- a) Do not drive- Driving is not permitted in patients with epilepsy as per Indian laws.
- b) Avoid swimming- Patients should avoid swimming or should be supervised while swimming. Patients with frequent seizures should not swim to avoid drowning. Taking a shower in running water is better than with a bucket full of water to avoid drowning if a seizure occurs during bathing.
- c) The patient should avoid going at height alone.
- d) Patients with frequent drop attacks can be given a helmet to avoid head injuries.



# FOLLOW UP CARE, FREQUENCY AND FOLLOW UP ASSESSMENT AT PRIMARY CARE LEVEL

Since epilepsy is a chronic disease, long-term follow-up is required. Generally, in a patient with well-controlled epilepsy 3-6 monthly follow up is adequate. In other epilepsy patients, a more frequent follow-up should be done. During each follow-up visit:

- Ask for the last seizure episode
- Ask for the compliance
- Ask if the patient had any reaction/side effects to the drug (especially if a new drug is introduced).
- Ask for sleep duration



- Preferably patients should maintain the seizure diary to record all this information. Patients immediate relative/ witness of the seizures should be interviewed for the seizure episodes.
- Ask for use of any alternate medications.
- In females, the drug changes may be required before conceiving, proper counselling is needed for this issue.
- Patients with well controlled epilepsy, who remain seizure free for > 3 years can be considered for tapering the drug dose. During tapering, the patient should be informed about the risk of breakthrough seizures with drug tapering.





# WHAT NOT TO DO IN THE EVENT OF A SEIZURE?

1

**Do not hold them  
down. This can lead  
to injuries and  
fractures.**

2

**Do not put anything  
to eat or drink in  
their mouth.**

3

**Do not make them  
smell shoes or onions**

# DEMENTIA

Dementia is a syndrome – usually of a chronic or progressive nature – in which there is deterioration in cognitive function (i.e. the ability to process thought) beyond what might be expected from normal ageing (WHO). It affects-

- Memory
- Thinking
- Orientation
- Comprehension
- Calculation
- Learning capacity
- Language
- Judgement and social interaction

## Potentially Non- Modifiable Factors

- Genetic factors

# RISK FACTORS

## Modifiable Factors

- Illiteracy
- Hearing Loss
- Diabetes
- Hypertension
- Obesity
- Smoking
- Depression
- Physical Inactivity
- Social Isolation
- Stroke





# SIGNS AND SYMPTOMS

Stages of Dementia			Sign & Symptoms
1	Early stage/Mild Dementia	The early stage of dementia is often overlooked, because the onset is gradual	<ul style="list-style-type: none"><li>. forgetfulness</li><li>. losing track of the time</li><li>. becoming lost in familiar places</li></ul>
	Middle stage/Moderate Dementia	As dementia progresses to the middle stage, the signs and symptoms become clearer and more restricting.	<ul style="list-style-type: none"><li>. becoming forgetful of recent events and people's names</li><li>. becoming lost at home</li><li>. having increasing difficulty with communication</li><li>. needing help with personal care</li><li>. experiencing behaviour changes, including wandering and repeated questioning.</li></ul>



# SIGNS AND SYMPTOMS

Stages of Dementia			Sign & Symptoms
1	Late stage/ Severe Dementia	The late stage of dementia is one of near total dependence and inactivity. Memory disturbances are serious and the physical signs and symptoms become more obvious.	<ul style="list-style-type: none"><li>• becoming unaware of the time and place</li><li>• having difficulty recognizing relatives and friends</li><li>• having an increasing need for assisted self-care</li><li>• having difficulty walking</li><li>• experiencing behavior changes that may escalate and include aggression.</li></ul>

# DIAGNOSIS OF DEMENTIA

No single test can determine dementia. Diagnosis is based on:

- Clinical including neurological examination
- Mental status examination
- Other laboratory tests to rule out other causes

Not all confusion and memory loss indicate dementia, so it's important to rule out other conditions, such as drug interactions and thyroid problems.





## Mini-Mental State Examination (MMSE)

The MMSE is a questionnaire for measuring cognitive impairment.

The MMSE uses a 30-point scale and includes questions that test memory, language use and comprehension, and motor skills, among other things. A score of 24 or higher indicates normal cognitive function. While scores 23 and below indicate that you have some degree of cognitive impairment.

# WHEN TO REFER?

A patient suspected to have dementia should be referred to a specialist in the presence of the following features:

- Rapidly progressive cognitive dysfunction
- Worsening impairment in activities of daily living
- Presence of focal neurological deficits such as paralysis of one half of the body
- Headache and vomiting
- Fever



- Involuntary weight loss and loss of appetite
- Incontinence of bowel or bladder
- Self-injury or injury to a caregiver
- Recent history of head trauma
- Associated seizures



# DIFFERENTIAL DIAGNOSIS

There are some conditions that may mimic dementia. These include:

**a. Delirium**

**b. Depression**

**c. Metabolic/ Endocrine Conditions**

**d. Drugs**





# PHARMACOLOGICAL INTERVENTION

Pharmacological treatment is largely guided by the type of dementia that is diagnosed. There is no curative therapy for dementia, and hence, the focus is on the treatment of symptoms and associated comorbidities, including psychiatric concerns.

Some drugs that may be useful, predominantly for Alzheimer's disease, may be useful in other forms of dementia also, including:

## Cholinesterase Inhibitors

- These medications prevent the breakdown of acetylcholine in the brain, which helps in transmitting signals between neurons in the brain.
- These drugs include: Donepezil (5 mg, 10 mg, 23 mg), Rivastigmine (transdermal patch 4,6 mg/24 hours or 9.6 mg/ 24 hours), Galantamine (8 mg, 16 mg, 24 mg)



- Although these drugs may provide some benefit in memory, attention, and other symptoms, they mainly slow down the progression of dementia for a period of time.
- Some of the side effects include nausea, vomiting, diarrhea, fatigue, insomnia

## Memantine

- Memantine mainly helps to balance a substance called glutamate in the brain. It is used predominantly for moderate to severe Alzheimer's disease.
- Side effects may include giddiness, headache, constipation, fatigue, and somnolence.
- Occasionally, the above two drugs may be combined.





# NON-PHARMACOLOGICAL INTERVENTION

## Environmental modification

- Alterations must be made in the environment of the patient with dementia to make it safe and comfortable for the patient. There should be adequate lighting, handrails in the washroom, nightlight while sleeping etc. to ensure that the patient does not trip and fall. Noise and clutter should be reduced.
- Memory training
- External memory aids such as reminder notes or alarms on the patient's phone may be used.
- Patients with dementia should be encouraged to participate in activities that demand mental activity such as doing the crossword, playing sudoku to keep their mental abilities sharpened.



## Adequate sensory cueing

- Vision and hearing issues among persons with dementia must be corrected with the help of spectacles or hearing aids so that they are able to better interact with their family and friends.

## Simplification of tasks

- Complex tasks may be simplified or broken down into several simpler individual tasks to avoid confusing the patient with dementia.

## Dementia support groups

- Patients with dementia must be encouraged to maintain their social network and possibly, become part of a dementia support group for moral support and social interactions.

## Other therapies

- Other therapies which may provide relaxation among these patients include music therapy, aroma therapy, light exercises, art therapy.





# PSYCHOSOCIAL INTERVENTIONS

- Cognitive behavioral therapy
- Psychotherapy and psycho-educational interventions
- Behavioural management therapy

## Prognosis

Patients with dementia have shorter lifespans than those without dementia. Women tend to live longer than men. Several features are associated with shortened survival: feeding issues, malnutrition, swallowing difficulties, admission to hospital and advanced stages of dementia. Additionally, the presence of comorbid diabetes, heart failure, cancer, and infections further worsen prognosis.





# ALZHEIMER'S DISEASE

Alzheimer's is a degenerative brain disease that is caused by complex brain changes following cell damage. It leads to dementia symptoms that gradually worsen over time. The most common early symptom of Alzheimer's is trouble remembering new information because the disease typically impacts the part of the brain associated with learning first.

## Risk Factors

- Advancing age, illiteracy, addiction, hypertension, diabetes, poor socioeconomic status, trauma, familial or genetic factors, nutritional factors, and stroke.



## Sign and Symptoms

- The initial and most common presenting symptom is episodic short-term memory loss with relative sparing of long-term memory and can be elicited in most patients even when not the presenting symptom.
- Short-term memory impairment is followed by impairment in problem-solving, judgment, executive functioning, lack of motivation and disorganization, leading to problems with multitasking and abstract thinking.
- In the early stages, impairment in executive functioning ranges from subtle to significant.



- This is followed by language disorder and impairment of visuospatial skills. Neuropsychiatric symptoms like apathy, social withdrawal, disinhibition, agitation, psychosis, and wandering are also common in the mid to late stages. Difficulty performing learned motor tasks (dyspraxia), olfactory dysfunction, sleep disturbances, extrapyramidal motor signs like dystonia, akathisia, and parkinsonian symptoms occur late in the disease.
- This is followed by primitive reflexes, incontinence, and total dependence on caregivers.





# Thank You

