

# NOCTURNAL FRONTAL LOBE EPILEPSY (NFLE): MEDICAL SLEEP DISORDER

**Mahnaz Akhtar<sup>1</sup>, Khadim Abbas<sup>2</sup>, Mohd Maroof Siddiqui<sup>3</sup>**

<sup>1,2,3</sup> *Department of Electronics and Communication Engineering, Integral University, (India)*

## ABSTRACT

This paper contains the details of sleep disorder, types of sleep disorder, mainly sleep disorder is categorised as dyssomnias and parasomnias. The diseases under these categories are discussed in brief. This paper mainly comprises the details of Nocturnal frontal lobe epilepsy that comes under the parasomnias. It contains the information like what NFLE is? What are its symptoms, causes, detection etc.? So, Nocturnal frontal lobe is a kind of seizure that comprises violent behaviour, only or mainly during sleep. During a NFLE seizure, patients often exhibit behaviours that resemble sleep terrors. Sudden, explosive arousal from non-REM sleep, often within 30 minutes of falling asleep. Vocalizations, including screaming or laughing, Arm and leg movements, such as one arm extended while the other flexes; kicking or bicycle-peddalling motions of legs; rocking; or stiffening of the limbs and finally returning to sleep immediately after the seizure. It can be caused by abnormalities such as tumours, stroke, infection etc. Nocturnal frontal lobe can be treated by Anti-seizure drugs are provided and in case of failure ,surgery is another option that is removing the focal point, dividing the focal point inspiring the vagus nerve.

**Keywords:** *Nocturnal Frontal Lobe Epilepsy, Dyssomnias, Parasomnias, Polysomnograms, Electroencephalogram.*

**Abbreviations:** REM=Rapid eye movement; NFLE=Nocturnal frontal lobe epilepsy;  
EEG=electroencephalogram; FLE=frontal lobe epilepsy; TLE=Temporal lobe epilepsy

## I. INTRODUCTION

Sleep is associated with an urge to lie down for several hours . The nature of consciousness is changed during sleep.We experience some dreaming during sleep.We may recall very little of the mental activity that occurred during sleep.

There are two main types of sleep:

- *Non-Rapid Eye Movement (NREM) :*
  - Stage1: Our eyes are closed, but it is easy to wake us up and the brain produces high amplitude theta waves, which are very slow brain waves. This period of sleep lasts only a brief time (around 5-10 minutes) . .
  - Stage2: In this stage, we are in light sleep. Our heart rate slows and body temperature drops .At this time, our body is getting ready to sleep. Body temperature starts to decrease and heart rate begins to slow.
  - Stage3: This is the deep sleep stage. It's harder to rouse us during this stage, and if someone wakes us up, we would feel disoriented for a few minutes. Delta waves occur during this stage.
- *REM:* This stands for rapid eye movement. REM sleep happens 90 minutes after you fall asleep. The first period of REM typically lasts 10 minutes. Our heart rate and breathing quickens. We can have

intense dreams during REM sleep, since our brain is more active. Babies can spend up to 50% of their sleep in the REM stage, while 20%.

## II. SLEEP DISORDERS

Sleep disorders are problems with sleeping, like trouble in having sleep or staying asleep, falling asleep at the wrong times, too much sleep, or doing unusual activity during sleep. It is a medical disorder and also called somniphobia.

## III. TYPES OF SLEEP DISORDER

**Dyssomnias:** This kind sleep disorder is caused by three major factors, first one is arising from within the body, second one is related to environmental conditions, and last one by disorders of daily rhythm.

- Insomnia: Insomnia is a sleep disorder in which there is an inability to fall asleep or to stay asleep as long as desired due to emotional stress, anxiety, depression etc.
- Narcolepsy: Narcolepsy is a neurological disorder that occurs when brain becomes unable to control sleep or wakefulness.
- Sleep disorder breathing: SDB comprises of sleep-related breathing abnormalities. It includes following disorders:
  - Sleep apnea: It is characterized by pauses in breathing or unusual breathing during sleep. Each pause in breathing, called an apnea, can last for several seconds to several minutes.
  - Snoring: Snoring is noisy breathing during sleep. It is the shaking of respiratory organs and this produces sound.
  - Upper Airway Resistance Syndrome : It is a sleep disorder, categorised by air route resistance to breathing during sleep
- Periodic limb movement disorder: It is a sleep disorder where patients move their legs involuntarily during sleep, and shows problem related to movement.
- Circadian rhythm sleep disorders: Daily rhythm sleep disorders all involve a problem in the timing of when a person sleeps and is awake.
- *Parasomnias:* This kind of sleep disorder involves abnormal and unnatural movements, behaviours, emotions, observations, and dreams in connection with sleep.
- *Sleep walking:* The person suffering from sleep walking arises from the slow wave sleep stage in a state of low consciousness and perform activities that are usually performed during a state of full consciousness, like walking, cleaning etc.
- *Bruxism:* Bruxism is the unnecessary grinding of the teeth and/or excessive. There are two main types of bruxism- one that occurs during sleep (sleep bruxism) and one that occurs during wakefulness (awake bruxism).
- *Bedwetting:* Bedwetting refers to the unintentional passage of urine during sleep.
- *Nocturnal frontal lobe epilepsy:* Frontal lobe epilepsy is characterized by recurrent seizures arising from the frontal lobes like screaming, reciting prayers, singing etc. during sleep.

#### IV. NOCTURNAL FRONTAL LOBE EPILEPSY

NFLE stands for Nocturnal frontal lobe epilepsy. NFLE originates from certain words like nocturnal means something that happens at night, frontal means front part of anything, lobe means a fairly round flat part of ear, and lastly epilepsy refers to a disorder in which a person has regular seizures. Nocturnal frontal lobe epilepsy is a condition which occurs only during sleep and arising from the frontal lobes. Autosomal dominant nocturnal frontal lobe epilepsy (ADNFLE) is an uncommon form of epilepsy that are found in families. This disorder causes seizures that usually occur at night while an affected person is sleeping. Some people have mild seizures that simply cause them to wake up from sleep. Others have more simple incidents that can include sudden, regular movements such as motions of the arms and bicycling movements of the legs. The person may get out of bed and stroll around, which can be mistaken for sleepwalking. The person may also cry, sing songs, produce different kind of voices or groaning sounds. These diseases are sometimes misunderstood as nightmares, night terrors.

The most common symptoms associated with an aura in people with ADNFLE are touchy, shivering, a sense of fear and a feeling of falling or being pushed. Some affected people have also reported a feeling of breathlessness, fast breathing or choking. It is unclear what brings on seizures in people with ADNFLE. NFLE seizures dominate in males (7:3)

##### 4.1 Symptoms of Nfle

- Sudden, awakening from non-REM sleep, often within 30 minutes of falling asleep.
- Produces different types of voices, emotions, like screaming, laughing, singing patriotic or reciting religious songs etc.
- Arm and leg movements, like, one arm is extended while the other bends, kicking or bicycle-peddaling, motions of legs, or boost hardening of the limbs.
- Returning to sleep immediately after the seizure

##### 4.2 Causes of Nfle

- Frontal lobe seizures can result from abnormalities — such as tumours, stroke, infection, or shocking injuries — in the brain's frontal lobes
- An abnormal gene causes an uncommon genetic disorder called autosomal dominant nocturnal frontal lobe epilepsy.
- If one of the parents has this form of frontal lobe epilepsy, you have a 50 percent chance of inheriting the gene and developing the disease yourself.
- In most cases, however, the cause of frontal lobe epilepsy remains unknown.

#### V. DIAGNOSIS OF NFLE

Frontal lobe epilepsy can be difficult to diagnose because its symptoms are similar from psychiatric problems or sleep disorders, such as night terrors.

It can be diagnosed by three methods-

- Brain Scan: Frontal lobe seizures can be caused by tumours, abnormal blood vessels or injuries. Brain imaging, usually magnetic resonance imaging is used to diagnose. MRI uses radio waves and a powerful magnetic field to produce very detailed images brain.
- Electroencephalogram (EEG): An EEG shows the electrical activity in our brain by putting a series of electrodes attached to our scalp. EEGs are often helpful in diagnosing some types of epilepsy, but results may be normal in frontal lobe epilepsy.
- Video EEG: Video EEG is usually performed during an overnight stay. Both a video camera and an EEG monitor works together all night. Doctors then matches what physically occurs when we have a seizure with what appears on the EEG at the same time.

## VI. TREATMENT OF NFLE

Earlier there were not many treatment option, but now there are many new anti seizure medication.

We have two ways of treating NFLE, first one is drug and other one is surgery.

### ➤ Medication:

All anti-seizure drugs seem to work equally for frontal lobe epilepsy.

Many drugs are in use now like: Carbamazepine (Tegretol), Phenytoin (DilantinKapseals), Gabapentin (Neurontin) etc.

### ➤ Surgery:

If our seizures can't be controlled with medications, surgery is another option. Surgery involves treating of the infected area of brain that is where seizures occur.

In general, surgery for seizures that aren't well controlled by medication may be quite successful.

Surgery may involve:

- Removing the focal point: If seizure occurs at a particular spot then tissue of that small part is removed.
- Isolating the focal point: surgeon may make a series of cuts to isolate that section of the brain that has seizure.
- Stimulating the vagus nerve: An artificial device is implanted to stimulate vagus nerve.
- Responding to a seizure: A responsive neuro stimulator (RNS) is a implanted device and gets activated at the time seizure and stops it.

## VII. CONCLUSION

Nocturnal seizures are important subset of epilepsy. when seizures continue to occur, even if only during sleep, they can still result in illness due to disruption of normal sleep structure. Occurrence of seizures in relation to the sleep-wake has important diagnostic inferences in several syndromes.

## REFERENCES

- [1] [http://en.wikipedia.org/wiki/Frontal\\_lobe\\_epilepsy#Treatments](http://en.wikipedia.org/wiki/Frontal_lobe_epilepsy#Treatments)
- [2] Mohd. Maroof Siddiqui et al "EEG Signals Play Major Role to diagnose Sleep Disorder" International Journal of Electronics and Computer Science Engineering, ISSN 2277-1956/V2N2, 2013, Pg 503-505

- [3] Mohd. Maroof Siddiqui “Electronics Signal Help In The Treatment of Paralysis.”, International Journal of Electronics Signal & System(IJESS), ISSN No : 2231-5969, volume 1 issue 2, 2012, Pg 63-67
- [4] Mohd. Maroof Siddiqui “Electronics Instruments Play Major Role In Diagnosis Processes” , International Journal of Computing and Corporate Research(IJCCR) , ISSN : 2249-054X, volume 2 issue 1, 2012
- [5] [www.ncbi.nlm.nih.gov](http://www.ncbi.nlm.nih.gov)
- [6] [http://en.wikipedia.org/wiki/Frontal\\_lobe\\_epilepsy#Causes](http://en.wikipedia.org/wiki/Frontal_lobe_epilepsy#Causes)
- [7] [http://upload.wikimedia.org/wikipedia/commons/0/0e/Lobes\\_of\\_the\\_brain\\_NL.svg](http://upload.wikimedia.org/wikipedia/commons/0/0e/Lobes_of_the_brain_NL.svg)
- [8] Power Spectrum Estimation using Welch Method for various Window Techniques: Hansa Rani Gupta, Rajesh Mehra, Sushila Batan NITTTR, Sector-26, Chandigarh, India. [www.ijret.org](http://www.ijret.org).
- [9] Nocturnal frontal lobe epilepsy A clinical and polygraphic overview of 100 consecutive cases: Federica Provini, Giuseppe Plazzi, Paolo Tinuper, Stefano Vandi, Elio Lugaresi and Pasquale Montagna