

Lights Out: Exploring Nocturnal Epilepsy

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Description

Epilepsy is a neurological disorder characterized by recurrent seizures. While seizures can occur at any time of the day, some individuals experience seizures predominantly during sleep. Nocturnal epilepsy, as its name suggests, poses unique challenges and considerations for both patients and healthcare providers. Nocturnal epilepsy refers to seizures that predominantly occur during sleep. While the exact mechanisms underlying this phenomenon are not fully understood, several factors contribute to the increased seizure susceptibility during sleep [1].

Brain activity during sleep: Sleep is a dynamic process characterized by distinct stages, including rapid eye movement and Non-Rapid Eye Movement (NREM) sleep. Changes in brain activity during these stages can influence seizure occurrence. For instance, seizures may be more likely to occur during transitions between sleep stages or during specific stages of sleep, such as NREM stage 2.

Circadian rhythms: The body's internal clock, governed by circadian rhythms, regulates various physiological processes, including sleep-wake cycles. Disruptions to these rhythms can influence seizure susceptibility, with some individuals experiencing a higher incidence of seizures at certain times of the day or night [2].

Sleep deprivation: Lack of sleep or irregular sleep patterns can trigger seizures in individuals with epilepsy. Sleep deprivation can disrupt neuronal excitability and lower the seizure threshold, making individuals more prone to experiencing seizures, particularly during sleep.

The symptoms of nocturnal epilepsy can vary widely among individuals and may include nocturnal seizures, these seizures can manifest as generalized tonic-clonic seizures, focal seizures, or other seizure types. Generalized tonic-clonic seizures typically involve loss of consciousness, convulsions and postictal confusion. Unusual behaviors during sleep, some individuals may exhibit unusual behaviors during sleep, such as vocalizations, movements, or automatisms, which could be indicative of nocturnal seizures. Sleep disturbances, nocturnal seizures can disrupt sleep architecture, leading to frequent awakenings, sleep fragmentation and excessive daytime sleepiness. Morning headaches, seizures occurring during sleep may lead to morning headaches, possibly due to disrupted sleep patterns or altered cerebral blood flow during seizures.

Diagnosis of nocturnal epilepsy is medical history that gives detailed information about the frequency, duration and characteristics of seizures, as well as any associated symptoms or triggers, can provide valuable insights into the diagnosis. Electroencephalogram monitoring during sleep can help identify abnormal electrical activity in the brain associated with seizures. Prolonged EEG monitoring, such as ambulatory or video-EEG monitoring, may be

necessary to capture nocturnal seizures. Sleep studies like polysomnography, which records various physiological parameters during sleep, can assess sleep architecture and detect any abnormalities associated with seizures. Imaging studies like Magnetic Resonance Imaging (MRI) and Computed Tomography (CT) scans may be performed to identify any structural abnormalities or lesions in the brain that could be contributing to seizures [3].

Effective management of nocturnal epilepsy involves a multidisciplinary approach tailored to the individual needs of each patient. Treatment strategies may include: Antiepileptic medications like Antiepileptic Drugs (AEDs) are the cornerstone of treatment for epilepsy, including nocturnal seizures. The choice of medication depends on factors such as seizure type, frequency and the patient's overall health. Lifestyle modifications that used for maintaining a regular sleep schedule, avoiding sleep deprivation and minimizing stress can help reduce the frequency of seizures in some individuals. Seizure alarms are the devices such as seizure alarms or monitors can alert caregivers or loved ones when a seizure occurs during sleep, providing an added layer of safety and support. Vagus Nerve Stimulation (VNS) therapy involves implanting a device that delivers electrical impulses to the vagus nerve, potentially reducing the frequency and severity of seizures, including nocturnal seizures. Surgical interventions like in cases where seizures are refractory to medical therapy and associated with a focal brain lesion, surgical resection or other neurosurgical procedures may be considered to remove or disconnect the epileptogenic focus.

Nocturnal epilepsy presents several challenges and considerations for patients, caregivers and healthcare providers, including: Safety concerns like seizures occurring during sleep can pose safety risks, such as falls or injuries, particularly if the individual sleeps alone or experiences frequent seizures. Impact on quality of life like nocturnal seizures can disrupt sleep patterns, leading to daytime sleepiness, impaired cognitive function and reduced quality of life for individuals with epilepsy and their families. Psychosocial implications are living with epilepsy, especially nocturnal epilepsy, can have psychosocial implications, including anxiety, depression, social stigma and limitations in daily activities. Treatment compliance are adherence to antiepileptic medications and treatment regimens may be challenging for some individuals, particularly if they experience adverse effects or difficulty incorporating medication schedules into their daily routines [4].

Ongoing research endeavors aim to deepen our understanding of the pathophysiology, diagnosis and management of nocturnal epilepsy. Some areas of interest and future directions include: Genetic studies that investigate the genetic basis of epilepsy, including genes associated with nocturnal seizures, may uncover novel insights into the underlying mechanisms and potential therapeutic targets. Advanced imaging techniques are advancements in neuroimaging techniques, such as functional MRI and diffusion tensor imaging, hold promise for identifying subtle structural and functional abnormalities in the brain that contribute to nocturnal epilepsy. Biomarkers for seizure prediction in developing biomarkers or algorithms based on physiological signals, such as heart rate variability or electro dermal activity, may enable early detection and prediction of nocturnal seizures, facilitating timely intervention and personalized treatment approaches.

Non-pharmacological interventions are exploring the efficacy of non-pharmacological interventions, such as dietary therapies or neuromodulation techniques in managing nocturnal epilepsy represents a promising avenue for research. Telemedicine and remote monitoring like Leveraging telemedicine and remote monitoring technologies can enhance access to specialized epilepsy care, facilitate remote seizure monitoring and empower patients to actively participate in their treatment and self-management. Patient-centered outcomes research that are used in conducting patient-centered outcomes

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Received: 01 February, 2024, Manuscript No. elj-24-130668; **Editor Assigned:** 03 February, 2024, Pre QC No. P-130668; **Reviewed:** 17 February, 2024, QC No. Q-130668; **Revised:** 22 February, 2024, Manuscript No. R-130668; **Published:** 29 February, 2024, DOI: 10.37421/2472-0895.2024.10.241

research can provide valuable insights into the lived experiences, preferences and needs of individuals with nocturnal epilepsy, guiding the development of tailored interventions and support services [5].

Nocturnal epilepsy poses unique challenges and considerations for individuals living with epilepsy and their healthcare providers. Understanding the underlying mechanisms, recognizing the symptoms and implementing appropriate management strategies are crucial for optimizing the care and quality of life of patients with nocturnal epilepsy. Through ongoing research, education and support, we can continue to advance our knowledge and improve outcomes for individuals affected by this complex neurological disorder.

Acknowledgement

None.

Conflict of Interest

None.

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How to cite this article: Misaghi, Felix. "Lights Out: Exploring Nocturnal Epilepsy." *Epilepsy J* 10 (2024): 241.