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Understanding epilepsy and seizure disorders: Advances in diagnosis and management.

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Introduction

Epilepsy is a chronic neurological disorder characterized by recurrent, unprovoked seizures, affecting millions of people worldwide. Seizures occur due to abnormal electrical activity in the brain, and their manifestations can vary widely, ranging from brief lapses in attention to severe convulsions. Despite its prevalence, epilepsy is often misunderstood, leading to social stigma and delays in diagnosis and treatment. Early recognition of symptoms and timely medical intervention are crucial in improving the quality of life for individuals living with this condition. [1].

The causes of epilepsy are diverse, encompassing genetic factors, brain injuries, infections, and developmental abnormalities. In some cases, no clear cause is identified, which is classified as idiopathic epilepsy. Advances in neuroimaging and genetic testing have enhanced our understanding of the underlying mechanisms, enabling more precise classification and personalized treatment approaches. Identification of specific epilepsy syndromes has also allowed clinicians to predict seizure types and potential outcomes, thereby improving patient care. [2].

Diagnosis of epilepsy typically involves a combination of detailed clinical evaluation, electroencephalography (EEG), and neuroimaging studies such as MRI or CT scans. EEG is particularly useful in detecting abnormal brain wave patterns and localizing seizure foci. In addition, continuous video EEG monitoring is increasingly employed in complex cases to capture and analyze seizures in real-time. Accurate diagnosis is critical, as seizure-like events can sometimes be caused by other conditions such as syncope, migraines, or psychogenic nonepileptic seizures.[3].

Management of epilepsy involves both pharmacological and non-pharmacological approaches. Anti-seizure medications (ASMs) remain the mainstay of treatment, with a variety of drugs available to target different seizure types. For patients who do not respond to medications, alternative therapies such as ketogenic diet, vagus nerve stimulation, and surgical interventions may be considered. Individualized treatment plans, regular follow-up, and patient education are essential components to optimize seizure control and minimize side effects. [4].

Recent research has focused on improving precision medicine for epilepsy, aiming to tailor treatments based on genetic, molecular, and electrophysiological profiles. Novel drug developments and gene therapy approaches hold promise for patients with refractory epilepsy. Additionally, wearable devices and mobile health technologies are being integrated into patient care to monitor seizure activity, predict events, and support adherence to treatment plans. Such innovations are transforming epilepsy management and enhancing patient empowerment. [5].

Conclusion

Epilepsy extends beyond controlling seizures; it also involves addressing psychosocial challenges. Individuals with epilepsy may face discrimination, educational barriers, and emotional distress, making support networks and counseling vital. Awareness campaigns and advocacy efforts are gradually reducing stigma and promoting understanding of the disorder. Comprehensive care

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that combines medical treatment, mental health support, and social inclusion remains the cornerstone of improving outcomes and overall well-being for people affected by epilepsy.

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