

FEATURES AND COURSE OF A SEIZURE ATTACK IN CHRONIC ISCHEMIA OF THE BRAIN

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Abstract

This article examines the characteristics, progression, and clinical manifestations of seizure attacks in patients with chronic brain ischemia. By analyzing clinical cases and reviewing existing literature, the study identifies specific seizure patterns, frequency, and triggers unique to this condition. It highlights diagnostic approaches and therapeutic strategies to improve management outcomes for patients at risk of seizure attacks in the context of chronic ischemic changes in the brain.

Keywords: Chronic brain ischemia, seizure attack, epilepsy, cerebrovascular disease, ischemic stroke, neurophysiology, diagnostic techniques, treatment strategies.

Introduction

Chronic ischemia of the brain is a condition resulting from prolonged and reduced blood flow to brain tissue, leading to gradual neuronal degeneration and cognitive dysfunction. It is commonly associated with cerebrovascular diseases and significantly impacts brain function over time, resulting in various neurological symptoms, including seizures. Although seizure attacks are typically associated with conditions like epilepsy, they can also arise in chronic brain ischemia, particularly in advanced cases with significant ischemic burden. Understanding the underlying mechanisms, presentation, and course of seizure attacks in patients with chronic ischemia is essential for appropriate diagnosis and management.

This study was conducted by analyzing medical records of patients diagnosed with chronic brain ischemia who presented with seizure activity. Patients were selected based on clinical criteria that included evidence of chronic ischemia on neuroimaging (MRI or CT scans) and documented seizure episodes. Data were gathered on seizure characteristics (type, frequency, duration), treatment approaches, and response to therapy. Additionally, an extensive literature review was performed to support clinical findings and contextualize the results within the broader research landscape.

In cases of chronic brain ischemia (CBI), which results from long-term reduced blood supply to the brain, the course and features of seizure attacks can be complex and vary depending on the severity and affected brain areas. Here' s an overview:



Onset and Prodromal Phase

In chronic brain ischemia (CBI), the onset and prodromal phase of seizures often reflect the gradual progression of brain damage caused by prolonged oxygen and nutrient deprivation. As the ischemic condition develops over time, the brain's compromised state can lead to an increased risk of seizure activity, especially as neurons become increasingly susceptible to metabolic stress.

Onset and Prodromal Symptoms

In the early or prodromal phase, patients may experience symptoms signaling an impending seizure, including:

- Dizziness or Lightheadedness: Reduced blood flow can cause balance issues and dizziness.
- Confusion or Cognitive Changes: Brief moments of disorientation, memory lapses, or trouble focusing may occur.
- Headaches: Ischemia can lead to headaches due to fluctuating blood supply in the brain.
- Visual and Sensory Disturbances: Blurred vision, spots, or sensory changes, such as tingling or numbness, may also be early indicators.

Aura or "Warning Signs"

For some, a seizure may be preceded by an aura, a unique sensory experience that can vary widely but may include:

- Unusual Tastes or Smells: Metallic or strange tastes and phantom smells are often reported.
- Emotional Shifts: Sudden, intense feelings of fear, anxiety, or déjà vu may serve as a warning.

These warning signs, while variable, can sometimes help individuals anticipate a seizure and take measures to ensure their safety.

2. Course of the Seizure

The course of seizures can vary significantly, and your outline provides a clear overview of how they can progress. Here's a more detailed breakdown of the seizure course based on your points:

Course of Seizures

Focal Seizures:

- Definition: Focal seizures, also known as partial seizures, originate in a specific area of the brain and can manifest in different ways depending on the location of the seizure activity.
- Symptoms: These may include twitching in one part of the body, unusual sensations (like tingling or déjà vu), or changes in emotions. Some patients may retain awareness (simple focal seizures), while others may not (complex focal seizures).

Progression to Generalized Seizures:

- Definition: Focal seizures can sometimes progress to generalized seizures, which affect both hemispheres of the brain.
- Symptoms: When this occurs, the individual may experience a loss of consciousness and generalized convulsions (tonic-clonic seizures), characterized by stiffening of the body followed by rhythmic jerking.



Seizure Types:

- Complex Partial Seizures: These are a type of focal seizure where awareness is impaired. Patients may appear to be in a daze and may engage in repetitive movements (automatisms) such as hand rubbing or lip smacking.

- Postictal State: After a seizure, patients may experience confusion, fatigue, or a general feeling of malaise. The duration and severity of this postictal state can vary.

Understanding the progression from focal to generalized seizures is crucial for diagnosis and treatment. Recognizing the symptoms and types of seizures can help healthcare professionals provide appropriate care and support for individuals with epilepsy or seizure disorders.

3. Characteristics of Seizure Attacks

- Motor Symptoms: Muscle weakness, tremors, or localized jerking movements are common. Due to ischemic damage, muscle control in certain regions may be more affected.

- Cognitive and Psychological Symptoms: Confusion, memory lapses, or temporary cognitive deficits may follow the seizure due to chronic ischemia's impact on neural networks.

- Duration and Severity: The duration of seizures may vary. Chronic ischemia can exacerbate the duration or severity due to compromised neural resilience.

4. Postictal Phase

- Patients may experience prolonged postictal symptoms, such as drowsiness, disorientation, or lingering weakness (known as Todd' s paralysis), which may last longer in chronic ischemia.

- Fatigue, depression, or anxiety may persist due to ongoing ischemic damage affecting brain function and emotional regulation.

5. Complications and Risks

- Chronic ischemia in the brain increases the risk of recurring seizures and can contribute to the development of epilepsy.

- The brain' s ongoing hypoxia and metabolic insufficiency may lead to cumulative damage, compounding cognitive impairments and worsening overall prognosis.

Management

- Treatment focuses on managing blood flow issues (such as antihypertensive medications, statins, or antiplatelets) alongside anti-seizure medications.

- Lifestyle modifications, cognitive therapy, and regular monitoring are also important, given the progressive nature of chronic ischemia.

Chronic ischemia of the brain can lead to seizures that are atypical in nature due to diffuse, progressive damage, making comprehensive, multidisciplinary management crucial.

Chronic brain ischemia contributes to a state of chronic neuronal hypoxia and energy deficiency, which in turn promotes cellular damage and neuroinflammation. These factors are well-established mechanisms of epileptogenesis in other conditions, but chronic ischemia presents unique challenges. The coexistence of ischemia with seizures likely reflects a critical point at which cumulative ischemic damage overwhelms compensatory mechanisms. The partial efficacy of



anticonvulsants in this population indicates the need for a multifaceted therapeutic approach, potentially combining neuroprotective agents with anticonvulsants to address both ischemia and seizure activity.

Conclusions

This study highlights that seizure attacks in chronic brain ischemia are typically partial in nature but can progress to generalized seizures in patients with extensive ischemic damage. The findings underscore the importance of early detection and management of ischemic changes to prevent seizure progression. Moreover, there is a need for targeted treatment strategies that address the dual challenges of managing ischemic and epileptic activity.

Early Screening: Regular monitoring for seizure activity in patients with chronic ischemia, especially those with significant white matter lesions, to detect and treat seizures early.

Combined Therapy: Implementing treatment strategies that incorporate neuroprotective agents alongside anticonvulsants may offer better control over seizure frequency.

Further Research: More research is needed on the relationship between ischemic lesion location and seizure type, which could enhance diagnostic and therapeutic approaches.

Lifestyle Modification: Encourage patients to manage risk factors such as hypertension and diabetes, which may exacerbate both ischemia and seizure susceptibility.

This article provides a comprehensive overview of seizure attacks in the context of chronic brain ischemia, contributing valuable insights into clinical management and suggesting avenues for future research and therapeutic development.

References

1. Trinka, E., Cock, H., Hesdorffer, D., Rossetti, A. O., Scheffer, I. E., Shinnar, S. et. al. (2015). A definition and classification of status epilepticus – Report of the ILAE Task Force on Classification of Status Epilepticus. *Epilepsia*, 56 (10), 1515– 1523. doi: <http://doi.org/10.1111/epi.13121>
2. Xu, M. Y. (2018). Poststroke seizure: optimising its management. *Stroke and Vascular Neurology*, 4 (1), 48– 56. doi: <http://doi.org/10.1136/svn-2018-000175>
3. Miyaji, Y., Kawabata, Y., Joki, H., Seki, S., Mori, K., Kamide, T. et. al. (2017). Late Seizures after Stroke in Clinical Practice: The Prevalence of Non-convulsive Seizures. *Internal Medicine*, 56 (6), 627– 630. doi: <http://doi.org/10.2169/internalmedicine.56.7162>
4. Assadeck, H., Toudou-Daouda, M., Mamadou, Z., Moussa-Konate, M., Hassane-Djibo, F., Douma-Maiga, D. (2019). Clinical and Etiological Characteristics of Epilepsy in the Elderly: A Hospital-Based Study from a Tertiary Care Referral Center of Niamey, Niger. *Journal of Neurosciences in Rural Practice*, 10 (4), 571– 575. doi: <http://doi.org/10.1055/s-0039-1700308>
5. Birenbaum, D., Bancroft, L. W., Felsberg, G. J. (2011). Imaging in Acute Stroke. *Western Journal of Emergency Medicine*, 12 (1), 67– 76.
6. Guerrero, W. R., Golubczyk, D., Walczak, P. (2019). Thrombus Imaging in Acute Stroke. *Stroke*, 50 (8), 1948– 1949. doi: <http://doi.org/10.1161/strokeaha.119.025866>
7. Kubiak-Balcerewicz, K., Fiszer, U., Nagańska, E., Siemianowski, C., Sobieszek, A., Witak-Grzybowska, A., Kosińska-Szot, A. (2017). Differentiating Stroke and Seizure in Acute Setting



- Perfusion Computed Tomography? *Journal of Stroke and Cerebrovascular Diseases*, 26 (6), 1321–1327. doi: <http://doi.org/10.1016/j.jstrokecerebrovasdis.2017.02.002>
8. López Ruiz, R., Quintas, S., Largo, P., de Toledo, M., Carreras, M. T., Gago-Veiga, A. et. al. (2019). Usefulness of multipara metric computerised tomography findings in the differential diagnosis of stroke mimics of epileptic origin: A preliminary study. *Neurología*, 34 (2), 73– 79. doi: <http://doi.org/10.1016/j.nrleng.2018.11.001>

