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Case Report

Focal Neurological Deficit Following a First Afebrile Seizure in a Child: A Case of Todd's Paralysis

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Abstract

Todd's paralysis, also known as postictal paresis, is a transient focal neurological deficit that may occur following an epileptic seizure and can closely mimic acute ischemic stroke. We present the case of a 3-year-old boy with no significant medical history, apart from multiple food allergies, who presented after a first afebrile generalized seizure followed by transient left-sided hemiparesis. Given the focal neurological deficit, an acute cerebrovascular or structural intracranial process was initially suspected, prompting activation of the stroke pathway and urgent neuroimaging. Cranial computed tomography and subsequent brain magnetic resonance imaging showed no evidence of hemorrhage, infarction, or other intracranial pathology. Further investigations, including laboratory testing, cerebrospinal fluid analysis, microbiological studies, respiratory viral testing, and urine toxicology, were unrevealing. The patient's motor deficit progressively improved and completely resolved within 24 hours. Electroencephalography demonstrated generalized epileptiform abnormalities, supporting an underlying epileptic disorder. The patient was subsequently treated with levetiracetam and referred for pediatric neurology follow-up. This case highlights the importance of recognizing Todd's paralysis as a potential stroke mimic in children presenting with focal neurological deficits after a seizure.

Keywords: *Todd's paralysis, Postictal paresis, Pediatric seizure, Stroke mimic*

Introduction

Seizures are among the common neurological emergencies encountered in children. A first nonfebrile seizure requires careful clinical assessment to determine whether the event represents an isolated seizure, an underlying epileptic disorder, or a manifestation of an acute neurological or systemic condition. Electroencephalography (EEG) is an important component of the diagnostic evaluation, while laboratory investigations, lumbar puncture, and neuroimaging should be guided by the individual clinical circumstances [1].

The presence of a focal neurological deficit following a seizure presents a particular diagnostic challenge. Acute hemiparesis may indicate ischemic or hemorrhagic stroke, cerebral venous thrombosis, infection, structural brain lesions, or other acute neurological pathology. Pediatric stroke can be difficult to recognize because its clinical presentation may be variable, particularly in younger children. Acute focal neurological deficits should therefore be considered potentially cerebrovascular until an alternative diagnosis has been appropriately established [2].

One important stroke mimic is Todd's paralysis, also known as postictal paresis. It is characterized by transient focal neurological dysfunction occurring after a seizure, most commonly manifesting as unilateral limb weakness or hemiparesis. Although its underlying mechanism remains incompletely understood, proposed mechanisms include transient postictal neuronal suppression and alterations in cerebral perfusion following seizure activity [3].

Todd's paralysis can occur following focal seizures as well as generalized tonic-clonic seizures. Reported incidence varies considerably according to the population studied, with estimates ranging from approximately 0.6% to 13.4%. Its duration is also variable, ranging from minutes to, occasionally, several days [3]. The clinical distinction between Todd's paralysis and acute ischemic stroke may be particularly challenging when the episode represents the patient's first recognized seizure and there is no previous diagnosis of epilepsy [4].

The present case describes a 3-year-old boy who developed significant unilateral hemiparesis following a first afebrile generalized seizure. The focal neurological deficit prompted urgent stroke evaluation and an extensive diagnostic work-up. Complete neurological recovery, normal neuroimaging, and abnormal EEG findings ultimately supported a diagnosis of Todd's paralysis as the initial manifestation of an epileptic disorder.

Case Presentation

A 3-year-old boy with no significant past medical history, apart from multiple food allergies, presented to the pediatric emergency department following his first episode of an afebrile generalized seizure.

While at school, he experienced a generalized seizure lasting approximately three minutes. Because school staff were aware of his food allergies and suspected a possible anaphylactic reaction, intramuscular adrenaline was administered, after which the seizure ceased.

Upon arrival of the emergency medical service at the school, the patient experienced a second episode with similar characteristics. Oral midazolam was administered; however, the patient spat out the medication within seconds. Despite this, the seizure terminated spontaneously after approximately two minutes. Following stabilization, he was transferred to the emergency department for further evaluation.

On arrival, his vital signs were stable: oxygen saturation 98%, heart rate 133 beats/min, blood pressure 103/67 mmHg, and temperature 36.8°C.

The Pediatric Assessment Triangle was abnormal, although the patient was in generally acceptable condition. He was agitated and demonstrated a focal neurological deficit consisting of left-sided hemiparesis, predominantly affecting the upper extremity, with motor strength graded at 2/5.

The emergency medical team reported that the patient had been lethargic during transport. However, by the time of arrival at the emergency department, he was considerably more alert and active, responding appropriately to verbal and sensory stimuli, with spontaneous eye opening and visual tracking. The remainder of the systemic examination was unremarkable.

Question I

Given the findings described above, what is the most appropriate initial management?

- Contact the school teachers to obtain a more detailed history regarding the characteristics and duration of the event.
- Given the reported lethargy, proceed with endotracheal intubation and urgent transfer to the pediatric intensive care unit.
- Activate the Stroke Code protocol and request urgent neuroimaging.
- Consider persistent anaphylaxis and administer a second dose of intramuscular adrenaline.
- Prioritize evaluation for an infectious etiology by ordering blood tests and performing a lumbar puncture

Correct Answer: C. The presence of an acute focal neurological deficit following a seizure, particularly unilateral hemiparesis, requires urgent evaluation for potentially serious intracranial pathology, including ischemic stroke, intracranial hemorrhage, cerebral venous thrombosis, or another structural lesion. Todd's paralysis is an important stroke mimic, but potentially life-threatening structural and vascular causes should first be excluded [3,4].

Clinical Course

The initial non-contrast cranial CT showed no evidence of intracranial hemorrhage or acute ischemia. Because the focal neurological deficit persisted and clinical concern remained high, brain MRI was subsequently performed. The MRI also showed no acute abnormality. The imaging report stated: "Midline structures centered with normal ventricular size. Intact gray-white matter differentiation. No signs of hemorrhage or infarction. Patent arterial and venous territories. Unremarkable study." The absence of structural or vascular abnormalities, together with the temporal relationship between the seizure and the focal neurological deficit, raised suspicion for a postictal neurological phenomenon.

Question II

After intracranial complications have been excluded, which additional investigations are appropriate based on the clinical context?

- Blood tests
- Lumbar puncture
- Urine toxicology screening
- Respiratory viral panel
- All of the above

Correct Answer: E. Following exclusion of an acute intracranial process, further investigations should be guided by the clinical presentation and differential diagnosis. Blood tests can identify metabolic, inflammatory, or infectious abnormalities. Lumbar puncture may help evaluate central nervous system infection when clinically indicated. Urine toxicology may exclude toxic exposure, while respiratory viral testing may be considered when infection is part of the differential. These investigations are not universally required for every child with a first afebrile seizure; their use should be determined by the individual clinical circumstances [1].

Clinical Course

Blood investigations demonstrated no elevation of acute-phase reactants, leukocytosis, or neutrophilia. The remainder of the complete blood count and basic metabolic panel was unremarkable. Coagulation studies were also within normal limits.

Lumbar puncture yielded clear, colorless cerebrospinal fluid. Gram staining showed no pathological findings, and an urgent multiplex PCR assay was negative.

At the time of admission to the pediatric ward, the urine toxicology screen, cerebrospinal fluid bacterial culture, and respiratory viral panel were still pending.

The patient was admitted for observation and completion of the diagnostic work-up. While still in the emergency department, he demonstrated progressive improvement in the strength of the affected left extremities. He remained clinically stable and asymptomatic throughout the afternoon and overnight.

The following morning, his physical and neurological examinations were completely normal, with 5/5 motor strength in the previously affected left upper extremity.

The respiratory viral panel and urine toxicology screen were negative. Cerebrospinal fluid bacterial culture remained pending for the final report; however, the microbiology team communicated negative preliminary results.

Question III

Which of the following should be performed next?

- Discharge the patient after receiving the remaining negative diagnostic results, with follow-up by his primary care pediatrician.
- Perform an electroencephalogram (EEG).
- Initiate immediate long-term antiseizure therapy solely because this was the patient's first afebrile seizure.
- Repeat neuroimaging and lumbar puncture because the diagnostic work-up is inconclusive.
- None of the above.

Correct Answer: B. An EEG is an important component of the evaluation following a first nonfebrile seizure because it can provide evidence of epileptiform activity and help characterize the underlying seizure disorder and recurrence risk [1].

Clinical Course

A wakefulness EEG was subsequently performed. The recording demonstrated a normal background activity with moderately frequent synchronous and occasionally asynchronous epileptiform discharges without clear hemispheric predominance. Occasional bursts of 1–2 seconds of irregular generalized spike-and-wave activity were also observed. These findings supported the presence of an underlying epileptic disorder and, together with the clinical course, strengthened the diagnosis of a seizure-associated postictal focal neurological deficit.

Question IV

After completing the clinical evaluation, including the history, physical and neurological examinations during and after the seizure, and the diagnostic work-up, what is the most likely diagnosis?

- Todd's paralysis (postictal paresis) as the initial manifestation of epilepsy
- Childhood absence epilepsy
- Self-limited epilepsy with centrotemporal spikes (formerly Rolandic epilepsy)
- Infantile epileptic spasms syndrome (West syndrome)
- None of the above

Correct Answer: A. Todd's paralysis (postictal paresis) is a transient focal neurological deficit occurring after an epileptic seizure. It most commonly manifests as unilateral weakness or paralysis and may closely mimic acute ischemic stroke [3,4]. In this patient, the diagnosis was supported by the temporal relationship between the seizure and hemiparesis, progressive spontaneous improvement, complete neurological recovery, normal CT and MRI findings, exclusion of infectious and toxic causes, and abnormal EEG findings. The patient was started on levetiracetam at 20 mg/kg/day and referred for continued pediatric neurology follow-up. He has remained seizure-free to date.

Discussion

Todd's paralysis is a well-recognized but potentially misleading postictal phenomenon. It may present as transient unilateral weakness or other focal neurological dysfunction following a seizure and can closely resemble acute ischemic stroke [3]. The diagnostic challenge is particularly relevant in children because pediatric stroke may have variable clinical manifestations and can be difficult to recognize promptly [2].

The presence of a seizure before the onset of weakness should not automatically exclude stroke. Seizures can occur at the onset of pediatric stroke, making urgent neuroimaging important when focal deficits persist. In the present case, the acute left-sided hemiparesis appropriately prompted activation of the stroke pathway and urgent imaging.

The initial CT showed no evidence of hemorrhage or acute ischemia, while subsequent MRI demonstrated no acute infarction or other structural abnormality. MRI is particularly valuable when clinical suspicion for an acute neurological process remains high despite an unrevealing CT [2].

The spontaneous improvement of the patient's hemiparesis was an important diagnostic clue. Reported incidence of Todd's paralysis varies considerably depending on the study population, ranging from approximately 0.6% to 13.4% following seizures. Duration may range from minutes to several hours or, less commonly, longer periods [3]. A prospective study of patients with generalized tonic-clonic seizures reported postictal paralysis lasting between 30 minutes and 36 hours [4].

The patient's complete neurological recovery within approximately 24 hours, together with normal structural and vascular imaging, strongly supported a transient postictal neurological deficit rather than an acute ischemic lesion.

EEG provided additional evidence supporting an underlying epileptic disorder. EEG is an important component of the evaluation following a first nonfebrile seizure because it can help identify epileptiform activity and assist with seizure classification and estimation of recurrence risk [1]. In this case, generalized spike-and-wave abnormalities and other epileptiform discharges supported the clinical suspicion of epilepsy.

EEG findings should nevertheless be interpreted in conjunction with the clinical history, seizure characteristics, neurological examination, and imaging findings. The decision to initiate maintenance antiseizure treatment following a first seizure should be individualized according to the overall recurrence risk and specialist assessment.

The additional laboratory and cerebrospinal fluid investigations in this case were performed because of the clinical context and differential diagnosis. Such investigations should not be interpreted as mandatory for every child with a first afebrile seizure. Laboratory testing, lumbar puncture, toxicology studies, and infectious investigations should be directed by specific clinical concerns [1].

The principal clinical lesson is that Todd's paralysis should be considered a diagnosis reached after appropriate exclusion of serious alternative causes rather than an assumption made immediately after a seizure. The combination of postictal focal weakness, normal neuroimaging, progressive spontaneous recovery, and supportive EEG findings can help establish the diagnosis.

Conclusion

Todd's paralysis should be considered in children who develop transient focal neurological deficits following a seizure. However, because the presentation can closely mimic acute ischemic stroke and other intracranial emergencies, potentially serious structural and vascular causes must be excluded promptly. This case emphasizes the importance of rapid neurological assessment, appropriate neuroimaging, EEG evaluation, and careful observation of the clinical evolution. Recognition of Todd's paralysis can prevent unnecessary interventions while ensuring that potentially life-threatening causes of acute focal neurological deficits are not overlooked.

Key Take-Home Messages

- Acute focal neurological deficits following a seizure require urgent evaluation to exclude stroke, hemorrhage, cerebral venous thrombosis, and other intracranial pathology.
- Todd's paralysis is an important stroke mimic and may occur even after a patient's first recognized seizure.
- Spontaneous and complete resolution of the neurological deficit supports a postictal phenomenon when structural and vascular causes have been excluded.
- EEG is an important component of the evaluation of a first nonfebrile seizure in children.
- Further investigations should be individualized according to the patient's clinical presentation and differential diagnosis.

Conflict of Interest

The authors declare no conflicts of interest.

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References

1. Hirtz D, Ashwal S, Berg A, et al. Practice parameter: evaluating a first nonfebrile seizure in children. Neurology. 2000;55(5):616-623.
2. Lee YJ, et al. Pediatric stroke. J Korean Neurosurg Soc. 2015;57(5):396-401.
3. Xu SY, Li ZX, Wu XW, Li L, Li CX. Frequency and pathophysiology of post-seizure Todd's paralysis. Med Sci Monit. 2020;26:e920751.
4. Rolak LA, Rutecki P, Ashizawa T, Harati Y. Clinical features of Todd's post-epileptic paralysis. J Neurol Neurosurg Psychiatry. 1992;55(1):63-64.
5. Dai AI, Demiryürek S. The clinical implications of Todd paralysis in children with benign Rolandic epilepsy. J Child Neurol. 2016;31(3):289-293.
6. Gibson LM, Whiteley W. The differential diagnosis of suspected stroke: a systematic review. J R Coll Physicians Edinb. 2013;43(2):114-118.
7. Edlow JA, Newman-Toker DE, Savitz SI. Diagnosis and initial management of the patient with suspected stroke and transient ischemic attack. Lancet Neurol. 2009;8(11):1003-1012.

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