

Case Report

## Levetiracetam-Induced Urinary and Fecal Incontinence in a Post-Stroke Adult: A Case Report

Zahra'a F Al-Sunni <sup>1\*</sup>, Yahya Sharahely <sup>1</sup>, Sarah Adnan Almuslem <sup>1</sup>

<sup>1</sup> Dammam Medical Complex, Dammam, Saudi Arabia

\* Correspondence: Zahra'a F. AL-Sunni; Dammam Medical Complex, Dammam, Saudi Arabia.

### Abstract

Levetiracetam (LEV) is a widely used second-generation antiepileptic drug with a generally favorable safety profile. Autonomic adverse effects, including urinary and fecal incontinence, are rarely reported, especially in younger adults. We report the case of a 47-year-old man with newly diagnosed hypertension who presented with an acute ischemic stroke and subsequently developed focal seizures treated with levetiracetam. Three months after discharge, he experienced daily urinary and fecal incontinence without concurrent seizures, cognitive impairment, metabolic disturbances, or new neurological deficits. Electroencephalography revealed no epileptiform activity. Given the temporal association with LEV initiation and the absence of alternative explanations, LEV-induced autonomic dysfunction was suspected. Discontinuation of LEV and initiation of valproic acid led to complete resolution of symptoms. This case underscores a rare but reversible autonomic adverse effect of levetiracetam and highlights the importance of clinical vigilance, particularly in patients with underlying cerebrovascular disease.

**Keywords:** Adult; Incontinence ; Levetiracetam ; Post-stroke ; Seizures

### 1. Introduction

Levetiracetam (LEV) is a second-generation antiepileptic drug widely used for focal-onset, myoclonic, and generalized tonic-clonic seizures due to its efficacy, favorable pharmacokinetics, and minimal drug-drug interactions [1]. Its primary mechanism of action involves binding to synaptic vesicle protein 2A (SV2A), thereby modulating neurotransmitter release and neuronal excitability [2]. Although generally well tolerated, LEV has been associated with neuropsychiatric adverse effects, including irritability, fatigue, and behavioral changes. Autonomic disturbances, particularly urinary and fecal incontinence, have been reported sporadically, predominantly in pediatric and elderly populations [3,4]. Such adverse effects in younger or middle-aged adults remain exceedingly rare. Here, we describe a case of reversible urinary and fecal incontinence in a middle-aged adult receiving levetiracetam for focal seizures following ischemic stroke.

### 2. Materials and Methods

A 47-year-old Saudi man with recently diagnosed hypertension presented with acute-onset left-sided weakness and slurred speech. He had a history of a transient ischemic attack eight months earlier that was not investigated. There was no prior history of epilepsy or paroxysmal neurological disorders. On admission, he was alert and oriented. Neurological examination revealed left upper motor neuron facial palsy, dysarthria, and complete left hemiplegia. Sensory examination was normal. Initial non-contrast brain CT demonstrated

Received: April 20, 2026

Accepted: April 30, 2026

Published: May 29, 2026

Copyright: © 2026 by the authors.

Submitted to JNNpsy for

possible open access publication under

the terms and conditions of the

[Creative Commons Attribution](#)

[\(CC BY\) license.](#)

ischemic changes involving the right centrum semiovale, left internal capsule, and left basal ganglia. CT angiography excluded large vessel occlusion. Brain MRI (without contrast) showed bilateral acute infarcts in the corona radiata, more prominent on the right, with background small vessel disease. No mass effect or hydrocephalus was present. Additional investigations included transthoracic echocardiography with bubble study (normal, no shunt), HbA1c 5.8 percent, LDL cholesterol 3.54 mmol/L, and a negative autoimmune screen.

### 3. Results and Discussion

On the fourth day of hospitalization, the patient developed focal motor seizures involving the left upper limb, followed by brief post-ictal drowsiness. Levetiracetam was initiated at 500 mg twice daily and later increased to 750 mg twice daily. He was also treated for post-stroke depression with escitalopram and quetiapine. The patient was discharged after two weeks on secondary stroke prevention therapy and enrolled in a structured rehabilitation program. At the three-month follow-up, he reported new-onset daily urinary and fecal incontinence that began shortly after hospital discharge. He denied recurrent seizures, cognitive decline, or new neurological symptoms. There was no evidence of urinary tract infection or metabolic abnormalities. EEG showed no epileptiform discharges. Given the close temporal relationship with LEV initiation and the exclusion of alternative causes, LEV-induced autonomic dysfunction was suspected. Levetiracetam was tapered and replaced with valproic acid 500 mg twice daily. Within weeks, both urinary and fecal incontinence resolved completely. The patient remained seizure-free and demonstrated emotional improvement. This case represents a rare instance of reversible urinary and fecal incontinence associated with levetiracetam in a middle-aged adult with underlying cerebrovascular disease.

#### 3.1. Proposed Mechanistic Hypotheses

Levetiracetam binds to SV2A, which is expressed not only in cortical and subcortical structures but also in brainstem and spinal regions involved in autonomic regulation [5–10]. SV2A expression has been demonstrated in the pons, including Barrington's nucleus (pontine micturition center), hypothalamus, thalamus, dentate gyrus, cerebellum, and spinal gray matter. Importantly, SV2A is present in sacral parasympathetic neurons and Onuf's nucleus, which innervates the external urethral and anal sphincters [6]. Modulation of SV2A in these regions may disrupt coordinated bladder and bowel control. LEV has also been shown to suppress transcortical long-loop reflexes in a dose-dependent manner [7], potentially impairing voluntary control over micturition and defecation. Additionally, although LEV is not directly GABAergic, it may indirectly influence GABAergic neurotransmission, similar to gabapentin, which has been associated with incontinence in susceptible individuals [12].

### 4. Conclusions

Several reports support the association between levetiracetam and incontinence. Pediatric cases describe reversible urinary and fecal incontinence occurring weeks after LEV initiation [11]. Similar findings have been reported in elderly patients and adult females without structural abnormalities or ongoing seizures [4]. Clinical trial data also document urinary incontinence as a serious adverse event resolving after LEV discontinuation [8]. Together with the present case, these reports indicate that LEV-induced incontinence, although rare, is clinically significant and potentially reversible. Levetiracetam, though generally safe, may rarely induce reversible urinary and fecal incontinence, particularly in patients with compromised neurological systems such as post-stroke individuals. Awareness of

this potential adverse effect allows timely recognition and intervention, often resulting in complete symptom resolution after drug withdrawal or substitution.

## 5. Acknowledgements

The authors thank the neurology and rehabilitation teams involved in the patient's care and acknowledge their contributions to clinical assessment and follow-up. We acknowledge the support provided by the first Eastern Health Cluster- Saudi Ministry- Saudi Arabia, and Dammam Central Hospital, Saudi Arabia.

## 6. Biography

Dr. Zahra'a Al-Sunni is a PGY-2 resident in Adult Neurology under the Saudi Commission for Health Specialties. She earned her medical degree from Warsaw Medical University in 2018. Following her graduation, she joined Dammam Medical Complex in Saudi Arabia, where she worked in the Neurology Service for three years, an experience that fostered her strong interests and commitment to the field of neurology. Her clinical and academic interests focus on developing expertise in adult neurological disorders, with a growing involvement in clinical research and medical education

1. Lyseng-Williamson, K.A. Levetiracetam: A review of its use in epilepsy. *Drugs* **2011**, *71*, 489–514.
2. Lynch, B.A.; Lambeng, N.; Nocka, K.; et al. The synaptic vesicle protein SV2A is the binding site for levetiracetam. *Nat. Neurosci.* **2004**, *7*, 553–559.
3. Alsallum, M.S.; Al Anazi, M.S.; Altwijri, S.H.; et al. Urinary incontinence related to levetiracetam use. *Cureus* **2021**, *13*, e14407.
4. Patel, A.; Delos Santos, M. Levetiracetam-induced urinary incontinence. *JOJ Urol. Nephrol.* **2017**, *4*.
5. Bartholome, O.; Van den Ackerveken, P.; Sanchez Gil, J.; et al. SV2 family members. *Front. Mol. Neurosci.* **2017**, *10*, 148.
6. de Groat, W.C.; Griffiths, D.; Yoshimura, N. Neural control of the lower urinary tract. *Compr. Physiol.* **2015**, *5*, 327–396.
7. Yokoyama, K.; Kuriyama, M.; Koike, Y.; et al. Suppressive effect of levetiracetam on human long-loop reflex. *Clin. Neurophysiol.* **2015**, *126*, 579–585.
8. Shorvon, S.; Perucca, E.; et al. Clinical efficacy of levetiracetam. *Neurology* **2000**, *54*, 743–748.
9. Ogunsakin, O.; Tumenta, T.; et al. Levetiracetam-induced behavioral abnormalities. *Case Rep. Psychiatry* **2020**.
10. Bertoglio, D.; Verhaeghe, J.; et al. SV2A in central nervous system disease. *J. Nucl. Med.* **2022**, *63*, 942–947.
11. Incecik, F.; Herguner, O.; et al. Urinary and fecal incontinence during levetiracetam therapy. *Ann. Indian Acad. Neurol.* **2015**, *18*, 479–480.
12. Gil-Nagel, A.; Gapany, S.; et al. Incontinence during gabapentin treatment. *Neurology* **1997**, *48*, 1467–1468.