

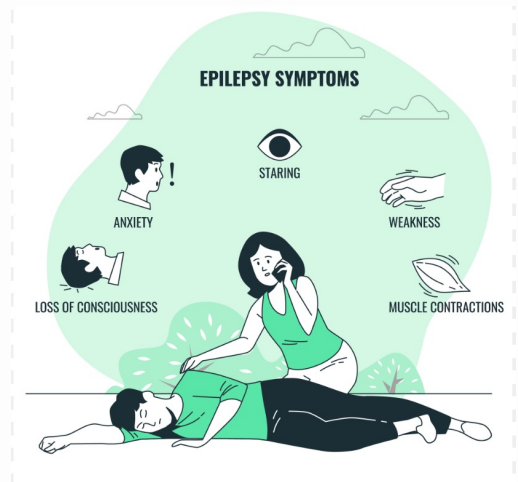
Nonconvulsive Status Epilepticus

A 27-year-old male brought into the ED by ambulance presenting with severe agitation and delirium. His only known medication is levetiracetam. He is incoherent and violent, requiring several security guards to control him and requiring soft restraints. Vital signs include blood pressure 150/93mmHg, heart rate 150bpm, respiratory rate 24 breaths per minute and temperature 100°F. Physical exam reveals a disoriented, agitated patient. He is diaphoretic and is contracting his extremities. Pupils are equal and reactive to light and oropharyngeal exam does not reveal any tongue lacerations. Muscle tone is mildly increased in the upper and lower extremities. The rest of the physical exam was unremarkable. The results from a STAT EKG are shown below.



He is given 3 doses of IM ketamine. 20 minutes later, his status is unchanged. Which of the following is the most appropriate next step in the management of this patient's condition?

- A) CT scan of the head with contrast
- B) MRI brain with and without contrast
- C) Electroencephalography
- D) Intravenous phenytoin infusion
- E) Lumbar puncture



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- **Figure 1.** Common symptoms in patients with epilepsy include loss of consciousness, anxiety, staring, weakness, and muscle contractions.

Discussion

The correct answer is D. Intravenous phenytoin infusion is useful for patients with active seizure or concern for status epilepticus.

Epilepsy is a disorder of recurrent and unpredictable seizures, characterized by excessive abnormal electrical brain activity. Uncontrolled seizure becomes a medical emergency as permanent damage to neurons can occur. Epilepsy has a broad variability of presentations; therefore, it is critical to appropriately diagnose the patient.

Nonconvulsive status epilepticus is a continuous state of seizure activity with cognitive or behavioral changes¹. This can be further separated into absence status epilepticus (ASE) and complex partial status epilepticus (CPSE)². A common feature of CPSE is confusion, although patients may have a range of symptoms (Table 1). CPSE may present with bizarre behavior, which may be confused with metabolic encephalopathies, delirium, or psychiatric disorders. CPSE has previously been misdiagnosed as psychiatric conditions such as schizophrenia⁴. These patients may have continuous seizures or repetitive discrete seizures with no recovery. This condition can continue for weeks or months and leave patients with prolonged cognitive deficits. Seizures may present with delirium at any state: ictal, interictal, or postictal².

Other differentials along with NCSE and acute drug intoxication in this case may include metabolic or toxic encephalopathy, psychiatric disorders, early brain hypoxia, and even hyperosmolar hyperglycemic state, among others. Differential diagnosis for this patient included drug intoxication, with possible amphetamines or synthetic cathinone intoxication. His clinical presentation did not change following several doses of ketamine, used for the patient’s severe agitation and delirium. Given the patient’s history of seizures, this needs to be on the differential diagnosis.

ASE vs. CPSE

	ASE	CPSE
Attitude	Unreactivity to threat	Anxious
	Lack of initiative	Aggressive
	inability to plan	Irritable
	Withdrawal	
Affect	indifference	Fearful
	Perplexity	"Ironic" appearance
	Crying	"Puzzled"
	Laughing	Smiling
Memory/cognition	Aggressivity	
	Variable amnesia	Diminished consciousness
	Slow ideation	Confabulation
	Disorientation	Amnesia
Speech		Disorientation
	Verbal perseveration	Verbal automatisms
	Monosyllabic answers	Speech arrest
	Lack of spontaneous speech	Mumbling
	Interrupted speech	Aphasia
Motor	Clicking noises in mouth	Abnormal vocalizations
		Mutism
		Humming
	Hippus	Complex motor automatisms
	Clumsy motor performance	Oroalimentary automatisms
	Motor perseveration	Motionless staring
	Automatisms (chewing;	Perseverative gesticulations
	compulsive handling of objects)	Head and eye deviation/nystagmus
	Rhythmic blinking	Limb extension
	Eye rolling	Blinking
	Small amplitude jerking of face or arms	Myoclonic jerks of face, mouth and limbs
Behavior	Quivering of lips	
	Tonic neck spasms	
	Ataxic gait/pseudoataxia	
	Wandering	
	Inappropriate for situation with	Wandering
	preserved alertness	Violent behavior
	Infantile behavior	Agitated unresponsiveness
Fugue states	Psychotic behavior	
Catatonia		

➤ **Table 1.** Clinical features of nonconvulsive status epilepticus (NCSE): differentiation between absence status epilepticus (ASE) and complex partial status epilepticus (CPSE)³.

Diagnosis and Treatment

The gold standard to diagnose NCSE is with EEG demonstrating ongoing focal or generalized epileptic activity. In the ED, EEG can be considered if available and if the patient is paralyzed, intubated, or if refractory status epilepticus (SE) is suspected. Workup remains the same as those with typical seizure activity, including metabolic panel, serum glucose, and urine and serum toxicology screen. Treatment also follows similar guidelines as that of generalized seizures. First-line treatment consists of IV benzodiazepines (lorazepam, diazepam), which have a good prognosis except in atypical ASE¹. Second-line treatment includes valproic acid, phenytoin, and levetiracetam, although the efficacy of these medications may vary based on the subset of NCSE. Third-line treatments includes sedatives and barbiturates like pentobarbital, midazolam, propofol, and high-dose phenobarbital, which induces an iatrogenic coma, requiring intubation and mechanical ventilation. Mortality increases with each refractory treatment.

Take Home Points

- **Clinical features of NCSE are highly variable and potentially unusual, necessitating a proper history, physical, diagnostic work-up and differential diagnosis.**
- **As patients are commonly misdiagnosed, physicians must have a high degree of suspicion to differentiate potential ictal states from types of encephalopathies, delirium and other disorders.**
- **Patients may present with cognitive impairment, speech arrest, twitches, autonomic signs, and bizarre behaviors, among others.**
- **NCSE diagnosis is confirmed by EEG capture of ongoing ictal activity.**
- **Treatment guidelines remain the same as generalized seizures, however patient response varies based on sub-type of NCSE and on time to treatment.**

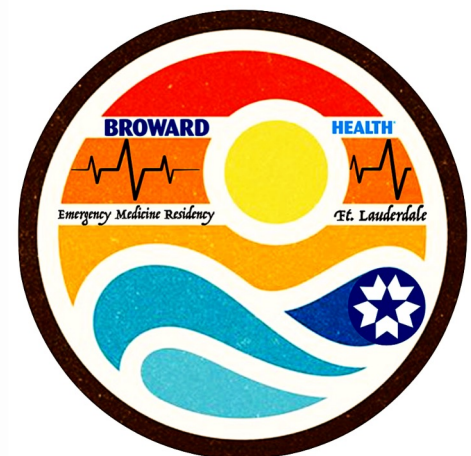


About the Author

This month's case was written by Adya Ali. Adya is a fourth-year medical student from Nova Southeastern University KPCOM. She completed her emergency medicine rotation at Broward Health Imperial Point in July 2023. Adya plans on pursuing a career in Neurology after graduation.

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