



# Seizure vs. Syncope: Differentiating

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## Emma's Emergency

Emma, 22, presents to the emergency department (ED) with a first episode of loss of consciousness immediately following a blood donation.

As she began to rise, she experienced a buzzing sound in her ears and a sick feeling in her stomach. She felt "faint" and the next thing she remembered was waking in the midst of paramedics.

Her friend witnessed the episode and described convulsive movements lasting for 10 seconds. In the ED, her vital signs and neurologic examination were normal, as were her electrocardiogram and electroencephalogram (EEG).

**What's your diagnosis? See page 77.**



## Vic's Visit

Vic, 32, presents with a three-year history of "blackouts".

These began with a sick feeling in his stomach and he would lose his memory for one to two minutes, followed by another five minutes of disorientation.

His brother stated that his eyes would be open, but he would not respond and appeared "zoned out". At times he would bite his tongue and lose bladder control.

Some of the prolonged episodes were associated with convulsive movements of all four extremities. Neurologic examination was normal. Computed tomography (CT) scan of the brain, electrocardiogram, and electroencephalogram were normal.

**What is your diagnosis? See page 77.**



**W**ith a lifetime incidence of 3% to 4%, epilepsy is one of the most common conditions seen in neurology clinics.

Syncope, on the other hand, represents approximately 3% of all visits to the emergency department and 6% of all hospital admissions.<sup>1</sup>

The history and semiology of the events is helpful in distinguishing the two conditions (Table 1). An accurate diagnosis is imperative for pertinent ancillary studies and in formulating a long-term management plan.

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Table 1

## Distinguishing features of seizure and syncope

Pre-event	Seizure	Syncope
Warning symptoms	May be preceded by an aura	Lightheadedness, feeling of faintness/"doom"
Provocative factors	Alcohol or medication withdrawal, CNS infections, trauma	Change of posture, pain, dehydration, anxiety, cough, micturition, etc.
Patient appearance	Same; may be staring	Pale, ashen, sweating
Posture	Any	Usually upright, may be sitting
Onset	Sudden	Gradual
During event	Seizure	Syncope
Duration of event	Seconds to minutes	Seconds
Bowel/Bladder incontinence	May be present	None
Injuries	More common	Infrequent
Tonic/clonic movements	Generalized or focal	Rare, usually bilateral
Autonomic features	Tachycardia, increased blood pressure	Low pulse/blood pressure, dilated pupils
Post-event	Seizure	Syncope
Confusion/Disorientation	Present for several minutes	Usually rapid return to baseline
Speech	May be garbled	Normal
Pain/muscle soreness	Present after a generalized tonic-clonic seizure	Absent
Focal transient neurologic deficits	May be present	None



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**Q:** *What is a seizure?*

**A:** A seizure is a clinical episode resulting from an excessive, abnormal, synchronized discharge of cortical neurons.<sup>2</sup> The clinical manifestations vary from transient loss of awareness to alterations in sensory, motor, or psychic perceptions.

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**Q:** *How are seizures classified?*

**A:** Seizures are either focal or generalized. Focal seizures originate from a localized region of the brain, whereas generalized seizures simultaneously involve both hemispheres.

Generalized seizures include:

- absence seizures,
- atonic seizures,
- tonic seizures,
- clonic seizures,
- tonic-clonic seizures, and
- myoclonic seizures.

***F***ocal seizures originate from a localized region of the brain; generalized seizures involve both hemispheres at once.



Table 2

### Common causes of syncope?

- **Reduced vasomotor tone/reduced blood volume:**  
Vasovagal reflex, carotid sinus dysfunction, reduced venous return during micturition, Valsalva's maneuver, cough, weight lifting, *etc.*
- **Reduced cardiac output:**  
Myocardial infarction, aortic/pulmonary stenosis, cardiac arrhythmias (bradyarrhythmias or tachyarrhythmias)
- **Autonomic nervous system dysfunction:**  
Diabetes, amyloidosis, antihypertensive medications
- **Other:**  
Hypoglycemia, hypoxia, anemia

**Epilepsy is diagnosed when a patient has two or more unprovoked seizures.**

**Q:** *What is syncope?*

**A:** Syncope is a transient, self-limited episode of lost consciousness resulting from global cerebral hypoperfusion, and associated with generalized loss of postural tone.<sup>3</sup> Causes of syncope are listed in Table 2.

**Q:** *When can you say a person with seizures has epilepsy?*

**A:** Epilepsy is the tendency to have recurrent, unprovoked seizures. In clinical practice, when a patient has two or more unprovoked seizures, a diagnosis of epilepsy can be made.

**Q:** *Does a normal electroencephalogram (EEG) rule out a seizure disorder?*

**A:** No, a normal EEG does not rule out a clinical seizure disorder. The diagnostic yield of an EEG increases when repeated.

## The Scoop on Emma

Emma's case is a classic illustration of a syncopal episode. Volume loss (resulting from blood donation) and orthostatic hypotension are two possible triggers.

Patients often feel "faint", experience a fullness in the ears, and a cold sweat before losing consciousness. Rapid recovery on assuming a recumbent position is the norm.

Infrequently, a prolonged syncopal episode is associated with brief convulsive movements (convulsive syncope). Episodes are infrequent and often provoked by identifiable triggers.

## The Story on Vic

Vic is a typical example of complex partial seizure with infrequent secondary generalizations.

Unprovoked episodes, brief stereotypical behaviour and duration, tongue bite, loss of bladder control, and frequent recurrence are all features that support this diagnosis.

Note that a normal CT scan and EEG do not rule out the diagnosis. If complex partial seizures (focal seizures) are suspected, magnetic resonance imaging is the neuroimaging of choice. Repeat EEGs increase the yield of detecting abnormalities.

Based on the clinical description, Vic was prescribed carbamazepine with no further seizures.

A later EEG demonstrated left temporal sharp waves (epileptiform discharges) supporting the diagnosis of temporal lobe epilepsy.

***H***olter monitoring has  
a very low yield in  
evaluating neuro-cardiogenic  
syncope.



**Q:** *Is cardiac Holter monitoring recommended for all patients with syncope?*

**A:** Holter monitoring is not recommended on a routine basis, as it has a very low yield in the evaluation of neurocardiogenic syncope.

When cardiogenic syncope is suspected, especially in the presence of an underlying cardiac pathology, Holter recording has a higher diagnostic yield.

**Q:** *What driving restrictions are applicable for a single syncopal episode when cardiac and neurologic evaluation is normal?*

**A:** A one-month restriction for class five license applies following a solitary episode of loss of consciousness and a negative workup.

If the physician is confident of a vasovagal syncope, there are no restrictions.

Discussing the specifics with the local motor vehicle jurisdiction is recommended. [CME](#)

### Take-home message



- Seizures and syncope are the two most common causes of transient loss of consciousness.
- A detailed history and a witnessed account allows the physician to distinguish between the two entities and to arrange an appropriate workup and management plan.
- In the elderly, syncope from cardiovascular causes is more common than seizures as a cause of loss of consciousness.
- A normal EEG does not rule out epilepsy/seizures.

#### References

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