Abstract—Background: Syncope is an event that causes a transient loss of consciousness (LOC) secondary to global cerebral hypoperfusion. The transient nature of the event can make diagnosis in the emergency department (ED) difficult, as symptoms have often resolved by time of initial presentation. The symptoms and presentation of syncope are similar to many other conditions, which can lead to difficulty in establishing a diagnosis in the ED. Objective: This review evaluates patients presenting with a history concerning for possible syncope, mimics of syncope, and approach to managing syncope mimics. Discussion: Syncope is caused by transient LOC secondary to global cerebral hypoperfusion. Many conditions can present similarly to syncope, making diagnosis in the ED difficult. Some of the most emergent conditions include seizures, stroke, metabolic disorders, and head trauma. Other nonemergent conditions include catalepsy, pseudosyncope, or deconditioning. Many laboratory studies and imaging can be nondiagnostic during ED evaluation. For patients presenting with apparent syncope, immediate treatment should focus on identifying and treating life-threatening conditions. History and physical examination can aid in distinguishing syncope from common mimics and help identify and subsequently treat life-threatening conditions. Published by Elsevier Inc.

Keywords—chameleon; mimic; presyncope; syncope

INTRODUCTION

The prevalence of syncope in the adult population over the age of 45 years is approximately 19%, with a slightly higher prevalence in women (1). There is a lower prevalence of syncope in pediatric populations. Approximately 15% of patients between 8 and 18 years of age will experience a syncopal event, and it is exceedingly rare in children < 6 years old (2). A large cross-sectional study of U.S. emergency department (ED) visits demonstrated syncope accounted for 0.77% of those visits, with an admission rate of 32% (3). There is no consensus on the evaluation of syncope in the ED, and much of the diagnostic tests should be guided based on the history, physical examination, and patient comorbidities. Because of the broad etiology of syncope and the lack of consensus regarding the definition of syncope, many patients undergo an expensive evaluation, and about one-third of patients presenting with syncope do not receive a formal diagnosis (4). A cross-sectional analysis of U.S. hospitals in 2000 showed a total annual cost for syncope-related hospitalizations of $2.4 billion, with a mean cost of...
$5400 per admission (5). A better understanding of the causes of syncope and the many conditions that can present similar to syncope can help focus the evaluation and spare some patients potentially expensive and unnecessary tests.

Syncope is defined as a transient loss in consciousness (LOC) secondary to global cerebral hypoperfusion. Syncope can be divided into three main categories: reflex or vasovagal syncope, syncope secondary to orthostatic hypotension, and cardiogenic syncope (6). The treatment and prognosis depend on the etiology, though this is not always immediately identifiable in the ED. Common causes for misdiagnosis of syncope come from the fact that not all events including LOC are caused by global cerebral hypoperfusion, as in the case of metabolic disorders. Also, not all events of apparent LOC are in fact a true LOC, as in the case of cataplexy. The purpose of this article is to describe many of the disorders that can present similarly to syncope and help define ways to distinguish them from true syncope.

**DISCUSSION**

**Epileptic Seizure**

Seizures can have varying presentations. Grand mal seizures or other types of convulsive seizures are relatively easy to distinguish from syncope, but nonconvulsive seizures can be a more challenging diagnosis. Certain seizures can cause decreased or disorganized electrical activity in the areas of the consciousness network, mainly the reticular formation, which can cause LOC; however, it is not secondary to global cerebral hypoperfusion (7).

Part of the difficulty in distinguishing syncope from seizures is that they are often times not witnessed in the ED, and there is no gold standard diagnostic test for either disorder. A study of a subset of the Framingham Heart Study, which included 822 patients with a presenting complaint of syncope, showed that 4.9% of patients had a final diagnosis of seizure (8).

The majority of patients with epilepsy will experience tachycardia during and immediately after their seizure; however, a small subset, reported to be < 6%, may experience bradydysrhythmias (9). This subset of patients may present with a history suggestive of cardiac syncope from a bradydysrhythmia, and detailed history may reveal the initial epileptic seizure as the etiology of their symptoms. Studies of epileptic patients with implantable loop recorders show that episodes of ictal bradycardia and asystole may be much higher than previously thought, with episodes of ictal bradycardia occurring in about 2% of epileptic seizures and episodes of asystole occurring in about 0.5% of epileptic seizures (10,11). Ictal asystole seems to be linked to temporal lobe epilepsy and is rarely seen in generalized epilepsy (12). Though not the common presentation of seizures, sudden collapse and unexplained falls have been noted in isolated cases of temporal lobe epilepsy associated with ictal asystole (13). Some patients with temporal lobe epilepsy experience drop attacks in which they experience falls with or without warning, remaining unresponsive with their eyes closed for a period of 2–3 min—a presentation which can appear clinically indistinguishable from traditional syncope (14). Electroencephalogram (EEG) can be a vital tool in distinguishing syncope from these ictal dysrhythmias. However, in the setting of a transient LOC with a return to baseline before or during ED evaluation, the initiation of EEG monitoring in the ED is rarely warranted and can be further investigated in the outpatient setting.

While technically these occurrences of post-ictal bradydysrhythmias or asystole would meet the diagnostic criteria of syncope based on the transient LOC that is secondary to global cerebral hypoperfusion, it is important to understand this is from the underlying epileptic disorder, as opposed to an organic syncopal etiology.

In contrast to seizures being a syncope mimic in which an epileptic seizure appears clinically similar to syncope, the converse is true as well, in which a true syncope episode can appear clinically similar to a traditional seizure. This will be discussed later in the “Syncope Chameleons” section.

**Metabolic Disorders**

Many metabolic disorders can appear similar to syncope. A common example would be hypoglycemia. Symptoms of hypoglycemia may be autonomic in nature, including sweating, palpitations, or dizziness, or symptoms can be neuroglycopenic, such as confusion, drowsiness, or incoordination (15). This can lead to falls or LOC resembling syncope. While patients typically regain consciousness during an episode of hypoglycemia, they are likely to remain altered or confused until their glucose is corrected, as opposed to a patient who experiences syncope, who may return to baseline without any intervention. Hypoxemia or asphyxiation can also cause LOC, though it would likely be more apparent in the patient’s history or physical examination and, like hypoglycemia, the symptoms are unlikely to resolve unless the hypoxemia is corrected. Other metabolic causes of episodes presenting like syncope include heat stroke, carbon monoxide poisoning, or other toxic ingestions (Table 1).

Hyperventilation is one metabolic disorder than can lead to transient LOC. It is sometimes considered to be a subset of syncope, as the resultant hypocapnia from hyperventilation can lead to cerebral vasoconstriction and global cerebral hypoperfusion. However, some studies...
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