Syncope is defined as “[l]oss of consciousness and postural tone caused by diminished cerebral blood flow.”¹ It is a common complaint in both the emergency department (ED) and in prehospital medicine and is the sixth leading cause of hospital admission in people over the age of 65.²,³ Of course, estimates are limited by the accuracy of determining true syncope versus other transient causes of loss of consciousness. Transient loss of consciousness has a cumulative lifetime incidence of approximately 35%.⁴

**PATHOPHYSIOLOGY**

Before discussing the assessment and management of syncope, it is imperative to understand the multiple etiologies that lead to the final pathway of a transient loss of consciousness. Any process that results in a loss of consciousness must affect both cerebral hemispheres simultaneously or involve the reticular activating system in the brainstem. In the case of syncope, the pathologic process is transient, resulting from a loss of needed substrate to the brain (be it oxygen or other nutrients) that corrects without external therapeutic intervention (such as the administration of IV dextrose). Typically, the impairment of substrate delivery is caused in part by upright posture; thus, assuming a supine position after consciousness is lost improves substrate delivery and typically leads to spontaneous recovery.

As with any disease process, classification of etiology aids in diagnosis, treatment, and prognosis for patients. Understanding the patient’s prognosis aids in ensuring a safe disposition. Unfortunately, the classification schemes for etiologies of syncope are broad, vary by author, are to some degree subjective, and frequently overlap. For the purpose of this discussion, syncope will be classified into four broad categories: cardiac, neurologic, vascular, and idiopathic (Table 25.1).

Cardiac syncope is due to a transient lack of adequate cardiac output, causing inadequate cerebral perfusion and subsequent loss of consciousness. Dysrhythmia is a common cardiac etiology and is one of great clinical importance. The most common dysrhythmia associated with syncope are transient ventricular tachycardia (VT). These occurrences are seen most frequently in patients with a history of congestive heart failure and low ejection fraction and portend a poor prognosis (1-year mortality up to 40%). Other culprit dysrhythmias include severe sinus bradycardia or transient high-grade heart blocks, supraventricular tachycardias, sick sinus syndrome, and atrial fibrillation with rapid ventricular response. As a rule, all of the aforementioned dysrhythmias must be paroxysmal in nature to cause a syncope episode because there must be a return of cerebral perfusion for the patient to regain consciousness.

Other cardiac causes of syncope include restrictive cardiomyopathies, valvular heart disease (especially severe aortic stenosis and mitral regurgitation), pulmonary embolus, and rarely, cardiac ischemia (although syncope from such is most likely dysrhythmia related). Although these pathologies can cause transient reductions in cardiac output sufficient to create a syncopal episode, their overall occurrence is rare. One rare population of young patients who have dangerous syncope is the patient population that has congenital prolonged QT syndrome. This is why it is important to check a rhythm strip on almost every syncope patient.
Refl ex-mediated syncope is actually the most common cause and (barring secondary trauma, as from a subsequent fall or automobile collision) poses the best prognosis. Refl ex-mediated syncope occurs when the body has an inappropriate autonomic response to a change in posture. Under normal circumstances, when a person moves from recumbent to upright, a significant amount of blood (300–800 ml) will pool in the lower extremities. In response, the sympathetic nervous system causes peripheral vasoconstriction, stimulates increased cardiac contractility, and increases the heart rate. These processes counteract the transient “distributive shock” experienced by the central nervous system, thus preventing syncope.

For patients experiencing refl ex-mediated syncope, there is an inappropriate reflexive stimulation of the parasympathetic nervous system that overwhelms the appropriate sympathetic response. These patients experience hypotension, with or without bradycardia. The resultant lack of cerebral perfusion results in a syncopal episode.

Neurogenic syncope, as a pure cause of transient loss of consciousness, is actually a rare event. Many of the neurologic events that result in syncope have poorly explained mechanisms. Additionally, many neurologic events that involve a loss of consciousness are incorrectly labeled as syncope. It is important to note, however, that some neurologic causes of syncope represent serious pathologic processes, such as subarachnoid hemorrhage and transient ischemic attack. It is rare that such diseases manifest as a syncopal episode, but caution must be used if these diagnoses are considered.

**ASSESSMENT**

The first task in assessing and managing syncope, in both the prehospital and ED settings, is to separate syncope from the other potential reasons for a loss of consciousness. First, any nontransient loss of consciousness, by definition, is not syncope. A patient who has a loss of consciousness from hypoglycemia, requires IV dextrose, and then awakens to a normal level of consciousness has not had a syncopal episode. Likewise, if the patient has a complex, nonmotor seizure and then recovers from a postictal state to a normal mental status, this, too, is not syncope. However, for the EMS provider, all of these can be dispatched as “altered mental status,” “unconscious,” or “syncope,” depending on the local dispatch.
protocol as well as the information relayed by the caller to the call taker. This can incorrectly prejudice providers to assume or discount syncope as the diagnosis. The differential diagnosis of syncope is described more fully later in the chapter.

As with all medical problems, proper assessment and evaluation begin with an appropriate but focused history and physical examination. Although 85% to 90% of all patient pathology can be determined by history and physical, these are even more important in the case of syncope. There are very few diagnostic tests that will aid in determining the cause of a syncopal episode or in ascertaining syncope as the problem versus another malady. If one takes a diagnosis such as appendicitis, we know that it can be determined clinically almost 90% of the time, but also can be “confirmed” by computed tomography (CT) scanning, by surgical findings, or by the pathology results. However, in the case of a syncopal episode, there are few laboratory or other diagnostic studies that will aid significantly in the diagnosis.

History is the most important information in the case of syncope. For patients in the prehospital setting, the history obtained by EMS providers is pivotal to the patient’s evaluation. Because true syncope involves a loss of consciousness, there will be details of the event that patients will not be able to relay. Frequently these patients arrive alone to the ED, and the emergency physician has no opportunity to interview others who may have witnessed the episode. Therefore, maximizing history obtained at the scene and relaying this to the ED staff is pivotal to accurate diagnosis and treatment.

It is important to ask the patient what he or she can remember before the event. No recollection at all is of particular importance. If the patient felt no prodromal symptoms at all, and then had a period of unconsciousness, this is particularly concerning for cardiac causes of syncope. Chest pain, palpitations, and shortness of breath are other symptoms that can be associated with dysrhythmia or other cardiac pathology. Abdominal pain, nausea, or lightheadedness frequently precede reflex-mediated syncope. Always attempt to ascertain the last thing the patient remembers before the event, as well as the first thing he or she can remember after regaining consciousness.

In the case of a true syncopal event, the patient will not be able to relay information during his or her period of unconsciousness. Bystander interview is paramount, and as mentioned previously, EMS personnel may be the only medical providers able to obtain this vital information. Did the bystanders notice anything before the patient lost consciousness? Was there any seizure activity noted (tonic/clonic, focal, etc)? Where there any periods of apnea noted?

Bystander history is also imperative for determining the length of the unresponsive period. Unfortunately, this time interval will frequently be overestimated due to the anxiety provoked in bystanders seeing someone unresponsive. Still, careful and compassionate interviews by EMS personnel can frequently elucidate valuable references to attempt to establish time course. Was the patient unconscious for the entire 9-1-1 phone call? How long before EMS arrival did the patient regain consciousness?

Finally, prehospital providers must obtain the bystanders’ history of events as the patient regained consciousness. Did the patient’s mental status improve rapidly or was there a period of confusion? Did the patient have any complaints on awakening that he or she cannot recall now? Did the patient appear hot or cold, sweaty, or pale? If the bystanders took the patient’s pulse, what was the rate and quality?

Beyond the history of present illness, EMS providers must also obtain other pertinent medical history. Chronic health problems (especially cardiac, vascular, or neurologic problems) need to be documented because they are important risk factors in syncope. A complete medication list (as always) must be obtained because many medications can predispose a patient to syncope. Additionally, medications can frequently point to other causes of loss of consciousness that are not syncopeal episodes, such as seizures or hypoglycemia. Last oral intake should be ascertained to determine if the patient is at risk for hypoglycemia and to see if there are any confounders to mental status examination, such as drugs or alcohol.

A focused physical examination is always important for any complete patient assessment. Vital signs; skin condition; heart, lung, and abdominal examination; and thorough neurologic examination are essential. Many recommend checking orthostatic vital signs, at least lying and sitting (for fear of patient trauma if there is a fall when standing). However, there are many confounders to positive or negative orthostatic vital signs and even much debate as what are the appropriate and inappropriate changes. But if the patient becomes symptomatic with changes in position, this is important to note.

It is important to remember that, at the time of EMS assessment, the physical examination may be completely normal. Vital signs may be within normal
limits, and the remainder of the examination may be unremarkable. Unfortunately, this does not preclude the existence of serious pathology. Cardiac syncope in particular is likely to present with a normal physical examination, despite being potentially lethal.

Consistent with most prehospital encounters, diagnostic testing is of limited value. A glucose meter reading should be obtained, despite the fact that this rarely causes transient loss of consciousness. A prehospital 12-lead ECG is indicated because this may help risk-stratify the patient’s potential syncopal etiology. It is important to note, however, that a normal 12-lead ECG does not preclude life-threatening causes of syncope, nor should it affect patient disposition.

DIFFERENTIAL DIAGNOSIS

One of the most important steps in evaluating syncope is to ensure the event was truly a syncopal episode and not a loss of consciousness attributable to some other pathology. The most common pathology confused for syncope is seizures. Both clearly involve a loss of consciousness, and other findings classically associated with seizures can occur with true syncopal episodes. Incontinence is rare in syncope but does occur. Also, shortly following a syncopal episode, a patient may experience myoclonic jerks that can be confused with seizure. The most important distinguishing feature is the postictal period. Generalized seizure patients typically have postictal phases lasting minutes, whereas the return to normal mentation after a syncopal episode rarely exceeds 30 seconds.

Pseudosyncope is a psychiatric condition in which there is no actual loss of consciousness, and a syncopal episode is fabricated for whatever psychiatric reason exists. This condition is separate from psychogenic syncope, which involves a true syncopal episode (with an actual loss of consciousness) that is caused by a psychiatric stimulus (severe emotional distress, pain, other psychiatric condition). Frequently, it will be difficult to separate these in the prehospital environment. Confronting the patient regarding presumed pseudosyncope will frequently destroy the therapeutic relationship in an uncontrolled environment, and therefore should be discouraged.

Two other rare conditions that may be confused with syncope are narcolepsy and cataplexy. Narcolepsy is a condition in which patients have profound daytime sleepiness such that they may suddenly fall asleep in the middle of the day. This will rarely occur so suddenly, however, as to result in a loss in postural tone. Cataplexy, however, is defined as a sudden, uncontrolled loss of postural tone, and to witnesses this may appear as a syncpe episode. However, patients with true cataplexy will not have a loss of consciousness.

Many of the other presentations that are commonly confused with syncope are readily identifiable by healthcare providers once they assess the patient and situation. Such pathologies as hypoglycemia, stroke, cardiac failure, hypoxia, and the like should be readily identifiable to EMS providers performing their history and physical examination.

TREATMENT

For most cases of true syncope in the prehospital environment, needed immediate treatment is minimal. Unless witnessed by prehospital personnel, the event has almost by definition resolved on EMS arrival. As always, patients require a careful, thorough, but focused history and physical examination. Patients should receive cardiac monitoring to evaluate for dysrhythmia. The value of IV access is debatable, unless the suspicion for a cardiac dysrhythmia (which may recur and require IV medication) is high. Glucose testing is indicated. Although ischemia is rare, a 12-lead ECG should be performed by EMS if available.

DISPOSITION

Experience shows that patient disposition after EMS contact can be complicated, time consuming, and fraught with medical and legal hazards. This is particularly true for patients who, at the time of EMS assessment, are not having any complaints or lack an obvious acute pathology that requires intervention.

Unfortunately, patients experiencing syncope frequently fall into this category. Usually, by the time of EMS arrival, the patient has regained consciousness and mental capacity has returned to baseline. Even patients with potentially life-threatening causes of syncope, such as dysrhythmia, may have no complaints or physical examination findings during prehospital assessment.

So what should we do with these patients? In the vast majority of EMS systems, the only two choices are
to transport the patient or obtain an informed refusal of care and transport. It is rare that syncope patients require specialty referral centers, especially if they are asymptomatic at time of EMS arrival. Usually, the rare causes of syncope that may require specialty referral (e.g., myocardial infarction, subarachnoid hemorrhage, and trauma after syncope) do not present asymptotically. Therefore, for patients who agree to transport to the ED for evaluation, the closest facility is usually appropriate.

For the patient refusing transport, the EMS crew must decide if the patient has adequately displayed decisional capacity, including full understanding of risks, benefits, and alternatives. The explanation of the risks is perhaps the most paramount issue when considering the syncopal patient’s capacity to refuse transport. It is imperative that the prehospital personnel have a clear understanding of the pathologies previously mentioned and can correlate those with the patient’s presentation. The level of training of the prehospital personnel (EMT-Basic, EMT-Paramedic, nurse, or physician) will alter the ability to determine possible pathologies, the understanding of these, and the risk of not receiving evaluation in the ED.

The prehospital environment presents a complicated and dynamic practice arena, even more so than the ED. Due to this, it is impossible to cover all possibilities regarding patient presentation and disposition. In the end, it is up to the prehospital provider to ensure that the patient’s final disposition is safe and in the best interest of the patient. Although the patient’s right to make decisions regarding his or her health care (assuming decisional capacity, of course) is paramount and must always be respected, it is equally important that all patients fully understand the potential risks associated with their condition, and the evaluation and treatment options that exist.

**SUMMARY**

Syncope is a transient loss of consciousness with a spontaneous return to a normal, baseline mental status. It is a common complaint in both the prehospital and ED settings. Although the exact etiology of syncope is frequently not ascertained, careful history and physical examination can determine the cause for the majority of those patients that can be diagnosed. Certain diagnoses, especially cardiac dysrhythmias, can be potentially life threatening and require proper evaluation and observation. Safe disposition of the patient requires a careful evaluation in the prehospital setting, and appropriate explanation to those who frequently have no symptoms at time of evaluation.

**CLINICAL VIGNETTES**

**Case 1**
EMS is dispatched to a syncope call. On arrival, the crew finds a 27-year-old male who is confused and has urinated on himself. Bystanders say that he was standing when he suddenly slumped over and had tonic-clonic jerking. On assessment, he is confused and very diaphoretic, with normal vitals and a finger stick blood sugar of 27 mg/dl. After treatment with one ampule of dextrose 50% intravenously, the patient becomes more alert and states that he is an insulin-dependent diabetic who had been playing pickup basketball all afternoon and missed lunch. He refuses transport and goes home with family.

**Discussion**
In general, most syncope calls in young people are benign. Although most are vasovagal in nature, hypoglycemia must also be ruled out. In this case, the patient was still symptomatic on EMS arrival, which is clue that there may be a secondary cause to the syncope. Although a cause of true syncope is rarely found in the prehospital setting, it is important to rule out easily treatable causes of unconsciousness.

**Case 2**
EMS is dispatched to a call for syncope. On arrival, the crew finds a 73-year-old male who was sitting at dinner when he became pale and passed out.
He is complaining of chest pain. Current vital signs include a blood pressure of 180/100 mm Hg. Examination is otherwise unremarkable. A 12-lead ECG reveals ST-segment elevation in the anterior leads. The patient is transported to the nearest percutaneous coronary intervention center.

Discussion
Although it is rare that syncope is a presentation for myocardial infarction, it is important that any acute coronary syndrome be considered when certain at-risk populations have syncope. These populations include the elderly, patients with known coronary artery disease, and patients with strong coronary artery disease risk factors. Although 3- or 4-lead monitoring is important, it is also important to consider obtaining a 12-lead ECG in these patients.

REFERENCES