Case Report

The Mystery of Situational Syncope: A Case Series of Three Patients with Uncommon Histories

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Highlights

- As syncope can be triggered by several less-studied situations, rare underlying causes of syncope, such as cough, marijuana smoking, and flight, should not be missed in clinical settings.

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ABSTRACT

Syncope, characterized by a transient loss of consciousness, is among the most common reasons for emergency department visits worldwide and can be categorized into reflex syncope, orthostatic hypotension, and cardiac syncope. Situational syncope, a subtype of reflex syncope, is less frequently investigated than other forms. Herein, we describe three patients who presented to the Syncope Unit of Tehran Heart Center with unusual situational syncope triggers, along with the diagnostic methods and treatments used.

The first case was a 62-year-old woman who experienced five syncopal episodes over the past 2 years, all of which occurred at an airport during airplane takeoff. Following a prescription for midodrine to be taken before flights, no further syncopal episodes occurred. The second patient was an 18-year-old man with two syncopal episodes, both occurring after smoking marijuana. He was advised to discontinue marijuana use, and no further episodes were reported during a 1-year follow-up period. The final case was a 42-year-old man who was a heavy smoker, presenting with several syncopal episodes following bouts of violent coughing. After cough suppressant medications proved ineffective, he was successfully treated with gabapentin.

In conclusion, given the complex nature of diagnosing syncope in some cases, physicians should consider rare triggers when taking the medical history of patients with unexplained syncope.

Keywords: Syncope; Situational Syncope; Marijuana; Cough; Case Report

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Introduction

Syncope is a transient loss of consciousness (TLOC) caused by cerebral hypoperfusion, characterized by rapid onset, short duration, and spontaneous complete recovery. It accounts for 1–2% of annual emergency department visits in the United States.[1] Syncope is categorized into three main types: reflex (neurally mediated), orthostatic hypotension, and cardiac syncope. Reflex syncope results from a neurologically induced drop in blood pressure, which may also involve a decrease in heart rate.[2,3] As the most common type, reflex (neurally mediated) syncope can be further subdivided into vasovagal syncope, situational syncope, and carotid sinus syncope, as defined by European guidelines.[2,4] Situational syncope is less frequently described and investigated, and many of its causes and triggers remain poorly understood. Each condition contributing to situational syncope requires specialized history-taking and tailored management.[5]

The Syncope Unit at Tehran Heart Center is a referral clinic dedicated to the management of patients with syncope, particularly those with vasovagal syncope and situational types.[6] Cardiologists specializing in syncope evaluate patients presenting with TLOC as their chief complaint, obtaining a detailed medical history, and performing a physical examination. Subsequently, patients undergo diagnostic workups, which may include ECG, transthoracic echocardiography (TTE), seated and standing blood pressure and heart rate measurements, carotid sinus massage, ECG Holter monitoring, and head-up tilt table testing (HUTT), as recommended by current guidelines.[2,7]

In this report, we present unusual and rare triggers of situational syncope in patients referred to the Syncope Unit at Tehran Heart Center, underscoring the critical role of thorough history-taking and tailored management. Notably, all cases were diagnosed as reflex (situational) syncope by experienced cardiologists in the syncope unit, in accordance with current guidelines.

Case History/Examination

Case 1

A 62-year-old woman presented to our syncope unit with recurrent situational syncope episodes. While initial assessment and medical history suggested situational syncope, no traditional risk factors were identified. Over 24 months, she experienced five syncopal episodes, all occurring during airplane takeoff at airports. She previously tolerated flights without incident, but as her flight frequency increased, syncopal episodes began. She reported no prior stress-related syncopal events. ECG and TTE findings were unremarkable. The patient was prescribed 5 mg of midodrine hydrochloride to be taken 2 hours before airplane takeoff. During a 1-year follow-up period, she reported no further syncopal episodes despite two subsequent flights.

Case 2

An 18-year-old man presented to our syncope unit for an evaluation of two syncopal episodes. His ECG and TTE were normal. A HUTT test did not induce a TLOC, and a physical examination revealed no orthostatic hypotension. The patient reported that he had only smoked marijuana twice in his life and that each syncopal episode was associated with one of these instances. Both events occurred after he stood up from a sitting or lying position. The first episode occurred on the morning after he first smoked marijuana, and the second took place during the night of his second use, immediately after he awoke in bed. Each episode reportedly lasted for approximately 5 to 6 minutes. After a seizure was ruled out as a potential cause, the patient was diagnosed with situational syncope likely related to marijuana use.

Consequently, he was referred to a psychotherapist for counseling on substance abstinence. During a 1-year follow-up period, the patient reported no further syncopal episodes after discontinuing marijuana use.

Case 3

A 47-year-old man presented to our syncope unit with recurrent syncope episodes. All syncopal events occurred within the preceding 6 months and were consistently triggered by paroxysmal coughing. Each episode lasted 1 to 2 minutes, displaying classic features of situational syncope. The patient was a heavy smoker with a 30-pack-

year smoking history. Further history revealed he had experienced a chronic cough for several years before the syncopal episodes, with an established diagnosis of chronic obstructive pulmonary disease (COPD). He had been experiencing COPD exacerbation for 6 months at presentation.

Initial evaluation showed normal ECG and TTE results. Primary treatment focused on cough suppression with dextromethorphan syrup and salmeterol/fluticasone propionate inhaler. Nonetheless, the patient experienced another cough-induced syncopal episode 2 weeks later, despite mild symptomatic improvement.

Based on a published case report of refractory cough syncope responding to gabapentin,[8] we initiated gabapentin (600 mg/day). This regimen resulted in significant cough reduction and complete resolution of syncopal episodes during 1 year of follow-up.

Discussion

Syncope is a prevalent disorder and a common cause of TLOC among adults.[9] Herein, we describe three distinct cases of unusual syncope managed at the Syncope Unit of Tehran Heart Center. The rare triggers discussed in these cases include violent coughing, airplane takeoff, and marijuana use.

The condition in Case 1 is notable because the syncope occurred during takeoff before the aircraft reached high altitudes. This helps differentiate the cause of syncope from hypoxia, which usually occurs at high altitudes.[10] Moreover, as the vertical acceleration of passenger aircraft is insufficient to cause significant intravascular fluid shifts, the diagnosis of situational syncope is appropriate for this case. Therefore, flight itself, independent of hypoxic effects, which have been reported previously, can be a rare trigger for situational syncope, highlighting the importance of prevention in these patients. The underlying mechanism may involve changes in gravitational force (G-force) during takeoff. In addition, the absence of syncope both in other stressful situations and during previous flights before the onset of these episodes suggests that anxiety and stress were not the primary factors. Nevertheless, even if emotional or anxiety-related factors were present, the syncopal episodes were controlled with midodrine, although this medication is not known to treat anxiety. As an alpha-1-adrenergic receptor agonist, midodrine has demonstrated beneficial effects in controlling reflex syncope[11] and was also effective in this case.

Another syncope trigger, as presented in Case 2, is marijuana use, which may be due to cannabinoid-induced cardiac dysrhythmias.[12] The association is strengthened by the fact that the patient had only smoked marijuana twice, experienced syncope after each instance, and had no subsequent syncopal episodes after discontinuing its use. As previously described in a teenager, cannabis can cause an atrioventricular block, resulting in palpitations and a presyncopal state.[13] Further, marijuana can alter the autonomic nervous system through parasympathetic dominance, which primarily affects the pulse rate and can lead to bradycardia.[14, 15] This may lower the vasovagal reaction threshold, consequently causing syncope. Another plausible mechanism is dehydration caused by cannabinoid use,[16] which can also result in a syncopal event. 9 The occurrence of syncope upon standing, several hours after consumption, may indicate a neurally mediated component in addition to cardiac rhythm alterations following cannabis use. This case demonstrates the necessity of specifically asking about marijuana use when taking the medical history of patients with unexplained syncope, especially adolescents and individuals in countries where such use is illegal or culturally stigmatized. Behavioral therapy may be the most appropriate therapeutic option for these patients.

As observed in Case 3, a cough can rarely trigger situational syncope, most often in asthmatic patients or individuals with COPD.[17] The pathophysiology may involve an increase in intrathoracic pressure, a decrease in venous return, and a subsequent reduction in cardiac output, resulting in a TLOC.[18] Sharpey-Schafer[19] suggested that peripheral vasodilation and arterial hypotension were potential mechanisms of syncope following a cough. Additionally, studies have shown that patients with cough syncope experience more pronounced hypotension than other individuals.[20]

Conventional cough suppressant medications may not always lead to cough resolution, as was

observed in our patient.[21] Because chronic cough has been suggested to be a neuropathic disorder,[22] treatments with gabapentin can be effective. Gabapentin has demonstrated efficacy in a meta-analysis, and its use in a case report was associated with the control of related syncopal episodes.[8,23] The addition of gabapentin to a standard cough-suppression regimen may be an effective option for controlling cough-induced syncope.

In this report, we have underscored the significance of a thorough medical history, diagnostic workup, and appropriate management for patients with reflex syncope.[24] Situational syncope is a symptom with numerous triggers, some of which are rare or atypical. 2 However, most cases can be managed effectively through a comprehensive history, a detailed clinical examination, and a targeted workup.[25-27] In Case 1, prescribing midodrine hydrochloride for the patient to take before triggering situations proved effective. For Cases 2 and 3, management focused on eliminating the triggers for the syncopal episodes. In all three cases, the patients remained free of syncope during a 1-year follow-up period after their respective treatments.

Conclusion

The diagnosis and management of situational syncope can be challenging. Accordingly, successful management relies on identifying specific triggers and implementing appropriate treatment, which may involve eliminating the underlying cause or instituting preventive measures such as medication and patient education.

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Ethical Approval

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Conflict of Interest

The authors declare that they have no conflict of interest.

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