Cardiology in the Young

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Micturition syncope with asystole in a paediatric patient

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Brief Report

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Abstract

Syncope occurs frequently in children, and the differential includes situational syncope, specifically micturition syncope. We report the youngest child to our knowledge to have micturition syncope associated with a prolonged asystolic pause. He underwent a neurological and cardiovascular evaluation without additional findings. Behavioural modifications were instituted with no recurrent syncope.

Syncope is a frequent symptom in children and adolescents. Syncope is defined as a transient, self-limited loss of consciousness and postural tone with spontaneous and complete recovery without neurologic sequelae. Frequency estimates vary, but before the end of adolescence, at least 15% of children will experience at least one episode of syncope.[1] Syncope has been categorised as autonomic, cardiogenic, or neurogenic. Autonomic-mediated reflex syncope is the most frequent and accounts for about 75% of all cases of paediatric syncope.[2] Autonomic syncope is a broad category that includes situational syncope, in particular micturition syncope. Micturition syncope is defined as a transient loss of consciousness with onset immediately before, during, or after micturition. Micturition syncope has been well described in older male adults, but less commonly in children. Marzuillo et al describe four children, aged 7-16 years old, with classical clinical findings of micturition syncope with underlying renal complaints, but otherwise unremarkable cardiovascular workup. We report a case of the youngest child to our knowledge to have a documented episode of micturition syncope associated with a prolonged asystolic pause.

Case

A 9-year-old boy with ADHD was admitted to the epilepsy monitoring unit for a prolonged electroencephalogram for workup of recurrent spells of stiffening and poor responsiveness. He had experienced four episodes in 3 months prior to the presentation. Two episodes occurred overnight, which were unwitnessed, but he was found in the bathroom on both occasions. Another episode occurred while standing in line for lunch at school and the fourth episode occurred while urinating at home. He had undergone a normal neurological evaluation including a brain MRI and routine electroencephalogram. On the morning of the episode, he awoke from bed to go to the bathroom, became lightheaded and dizzy after which he sat down and had improvement in his symptoms. After voiding, he again became dizzy, lost consciousness, and fell, hitting the left side of his head on the wall. His fall was witnessed and was associated with eyes rolling back with whole-body stiffening for less than a minute. This spell was captured on an electroencephalogram and demonstrated no electrographic correlate besides background slowing. On a single-lead electrocardiogram, there was an asystolic pause captured with significant baseline artefact as shown in Fig 1. The total length was 24 seconds but there is likely an intervening QRS junctional escape beat at 11 seconds, which is obscured by a significant baseline artefact. The longest pause is likely approximately 13 seconds. He had spontaneous recovery of a normal heart rate with resumption of normal background activity on electroencephalogram as shown in Fig 2. Once lying supine, he regained consciousness, was alert, and answering questions appropriately. The patient recalled changes in his vision, pain in his left eye, and feeling of dizziness prior to his loss of consciousness. He had an unremarkable cardiovascular exam. He had normal electrolytes and no evidence of iron deficiency anaemia. His baseline electrocardiogram demonstrated normal sinus rhythm without any abnormalities. An echocardiogram demonstrated a structurally normal heart with normal biventricular systolic function. He underwent an exercise stress test with a normal exercise duration of 12 minutes on a Bruce Protocol with a peak heart rate of 200 beats per minute, with normal sinus and atrioventricular node function. He was instructed to follow behavioural modifications, specifically to sit down while urinating and to increase his hydration. Post-discharge, he had a 30-day continuous looping event monitor that was negative for further asystolic pauses. However, he did not have any syncopal events during that time. He was seen for a follow-up evaluation 5 months after discharge and continued to be symptom free.

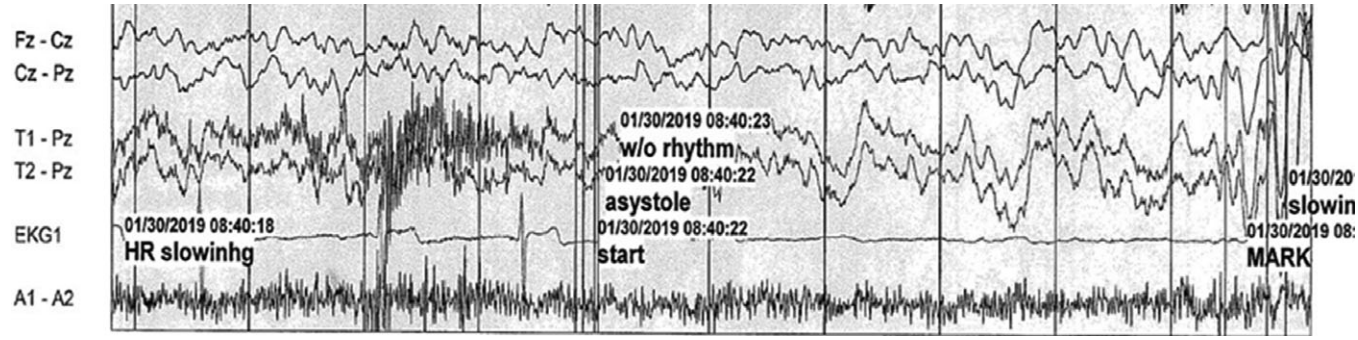

Figure 1. Prolonged asystolic pause seen on EEG recording.

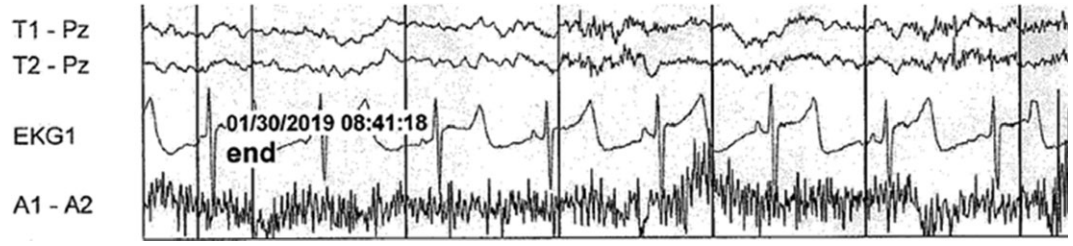

Figure 2. Return to normal sinus rhythm.

Discussion

To our knowledge, our patient is the youngest child reported to have micturition syncope with a documented prolonged asystolic pause. Syncope in young patients is most commonly due to a neurally mediated vasovagal response, which leads to global vasodilation and bradycardia, and then usually results in transient global hypoperfusion of the brain. Common triggers include an abrupt change in position, prolonged standing, hot shower, or an emotional stressor. Micturition syncope is another type of neurally mediated, situational syncope that is classically described in older adults, particularly men. The mechanism by which micturition syncope occurs is thought to be related to the Valsalva maneuver, diminishing the venous return to the heart, and the neurally mediated reflex during the urinary evacuation that triggers a fall in arterial pressure with a decrease in the heart rate.[3] Our patient underwent a thorough cardiovascular and neurological evaluation that was otherwise normal. He had a structurally normal heart and no evidence of abnormal atrioventricular conduction on diagnostic testing. As a result, he was diagnosed with micturition syncope with a prolonged pause secondary to an exaggerated autonomic/vagal response rather than a primary failure of his conduction system. We recommended behavioural modifications including aggressive hydration and sitting while urinating, which has kept him symptom free, thus far on subsequent follow-up evaluations.

Micturition syncope is a common neurally mediated, situational syncope in older adults. However, micturition syncope should be considered in the differential diagnosis of young patients if the clinical history supports it. The appropriate cardiovascular and neurological testing should be completed in regards to determining an aetiology. As part of his workup, we found that our patient had a documented prolonged asystolic pause with an otherwise negative cardiovascular evaluation. Even though the duration of his prolonged pause may be concerning, it was felt to be secondary to an exaggerated vagal response, therefore we did not perform any additional interventions from a medication or procedural standpoint. Patients with this phenomenon should first practice behavioural modifications, which may decrease the recurrence of syncopal episodes, before considering additional therapies.

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Conflicts of interest. None.

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