Unrecognized paroxysmal ventricular standstill masquerading as epilepsy: a Stokes-Adams attack

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ABSTRACT – Recognition of cardiac syncope masquerading as epilepsy may be difficult in the Emergency Department. We report a middle-aged man with recent onset convulsions who posed a diagnostic puzzle before it was found that he had paroxysmal ventricular standstill with complete atrioventricular block: he made a complete recovery after temporary pacemaker insertion. The main lessons from this case were (1) a convulsive seizure of only seconds duration and with an abrupt return of consciousness suggests syncope not epilepsy, (2) repeated, convulsive syncopes without provocation suggest cardiac syncope, (3) a 12-lead ECG should be recorded as soon as possible after such a series of episodes and should not be discontinued until an event is captured, and (4) Emergency Department clinicians should be familiar with any automatic gain on their ECG machine, lest fast, atrial activity be mistaken for narrow complex tachycardia. In summary, a good clinical history is of prime importance in differentiating convulsive syncope from epilepsy, and a simple, non-invasive cardiovascular evaluation may help to diagnose the condition as cardiac syncope.

Key words: atrioventricular block, epilepsy, seizure, Stokes-Adams attack, syncope, ventricular standstill, misdiagnosis

Epilepsy is one of the most common neurological disorders seen in the emergency department. Epilepsy is the condition of chronic, recurrent seizures that occur because of an inherent problem with brain hyperexcitability. Epileptic seizures are the phenomenon of abnormal synchronization of cortical neurons resulting in a change in perception or behavior which may be due to abnormalities of the brain, drugs, or a wide variety of metabolic derangements. However, many cardiovascular disorders may cause blackouts, complicated by abnormal movements due to generalized cerebral hypoxia, which may appear similar to epileptic seizures, leading to an incorrect diagnosis of epilepsy. Herein, we report a patient with unrecognized paroxysmal ventricular standstill, followed by complete atrioventricular (AV) block who presented with misleading symptoms suggestive of epilepsy.
Case report

A 62-year-old man presented to the emergency department with dizziness and general weakness following two, brief, generalized seizures. He had been observed to have a sudden loss of consciousness followed by a generalized convulsion, which terminated spontaneously within a few seconds. The same, seizure-like symptoms happened again after about half an hour. Until this complaint started, he was well and active, walking several blocks without dyspnea or chest pain. He had no knowledge of any previous medical problem and denied taking any other drugs or nutritional supplements. There was no history of trauma, headache, fever, chills, diplopia, dysarthria, dyspnea, orthopnea, chest pain or tightness, tinnitus, or hearing impairment. Vital signs were as follows: temperature - 36°C (96.8°F), pulse rate - 88 beats/min, respiratory rate - 18 breaths/min, and blood pressure - 107/78 mm Hg. Physical and neurological examinations were unremarkable apart from a slightly unsteady gait due to dizziness. A 12-lead electrocardiogram (ECG) showed normal sinus rhythm and normal QTc interval (figure 1A). His complete blood count, biochemical profiles and coagulation function were all normal. There were no remarkable findings on chest radiography and non-contrast computed tomography scan of the head. When he arrived in the department, he was observed undergoing a generalized convulsion with complete, spontaneous recovery after a few seconds. Consciousness was fully recovered without postictal confusion. A neurologist was consulted, high flow oxygen given and a continuous 3-lead ECG monitor connected. During his interview with the neurologist, the same, seizure-like episode was observed and it was noted that his cardiac rhythm changed (figure 2).

Figure 1. A) Lead II of initial 12-lead ECG showed normal sinus rhythm. B) Lead II of 12-lead ECG showed ventricular standstill during the seizure-like episode. C) Lead II of 12-lead ECG showed complete atrioventricular block after the seizure-like episode had terminated.

Figure 2. Lead II rhythm strip recorded during the seizure-like episode.
This was initially interpreted as demonstrating a narrow complex tachycardia until it was realized that the “tachycardia” was in fact atrial activity that had been amplified by the automatic gain to look like small amplitude QRS complexes (figure 1B). A subsequent 12-lead ECG confirmed the presence of complete AV block with a ventricular escape rhythm after the episode terminated (figure 1C). The seizure-like symptoms were in fact Stokes-Adams attacks due to periods of ventricular standstill.

The patient was given intravenous atropine sulfate 1 mg, and a temporary transvenous pacing wire was inserted. An echocardiography showed a normal left atrium and normal left ventricular size with normal ejection fraction. The serial cardiac markers were all normal. On day five after admission, spontaneous heart beating without the pacemaker trigger was noted. A Holter monitor recorded normal sinus rhythm without pacemaker spikes, but a significant ST segment depression was recorded. Because of the suspicion of coronary artery disease, subsequent coronary angiography was performed which showed normal coronary arteries. After removing the temporary pacemaker, he was discharged with cardiovascular clinic follow-up. According to the clinical record, he never suffered the seizure-like symptoms again.

Discussion

As many as 20% to 30% of epileptics may have been misdiagnosed (Zaidi et al. 2000). Many of these patients may have syncope with involuntary movements (convulsive syncope), which may be difficult to differentiate clinically from epilepsy. Syncope complicated by involuntary movements such as myoclonus or myoclonic jerks, is not an uncommon event, and has been reported in 12% of blood donors (Lin et al. 1982), and in 38 (90%) of 42 syncopal episodes among 56 patients provoked by a combination of hyperventilation, orthostasis and a Valsalva maneuver (Lempert et al. 1994). A Stokes-Adams attack is defined as sudden collapse into unconsciousness due to a disorder of heart rhythm in which there is a slow or absent pulse resulting in syncope with or without convulsions. Stokes and Adams first described the disorder in the early 19th century (Stokes 1846 and Adams 1827). An erroneous diagnosis of epilepsy carries serious consequences. Missing a cardiac arrhythmia could be fatal. In addition, patients may be inappropriately treated with potentially harmful anticonvulsant drugs.

Some important lessons can be learned from the present case. Firstly, a convulsive seizure of only seconds’ duration and with an abrupt return of consciousness implies syncope not epilepsy (Blume 2003). Secondly, repeated, convulsive synapses, without provocation, suggest cardiac syncope. Thirdly, a subsequent, 12-lead ECG obtained in a patient with recurrent seizure-like episodes is necessary and important (Hick 1954, Diaz-Castro et al. 2005, Leonard and Burns 2002). A 12-lead ECG should be recorded as soon as possible after such a series of episodes and should not be discontinued until an event is captured. Finally, the arrhythmia we interpreted as a narrow complex tachycardia was, in fact, atrial activity that had been amplified by the automatic gain to look like small amplitude QRS complex confirmed by a subsequent 12-leads ECG. This increase in automatic gain resulted in delayed recognition of periods of ventricular standstill (Leonard and Burns 2002). Emergency Department clinicians should be familiar with any automatic gain in their ECG machine, lest fast atrial activity be mistaken for narrow complex tachycardia.

Conclusion

A good clinical history is of prime important in differentiating convulsive syncope from epilepsy, and a simple, noninvasive cardiovascular evaluation may help to diagnose the condition as cardiac syncope. 

References

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