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Editorial

Ictal asystole: How to unveil the hidden ties between the brain and the heart

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Ictal asystole (IA) can be a challenging diagnosis. It requires recognition of both epileptic and syncopal phenomena and symptoms can be ambiguous [1,2]. Clinical suspicion must therefore be confirmed by simultaneous video-EEG and ECG recordings [2]. IA seems a rare event in a clinical setting (mean prevalence of 0.32% in people with refractory epilepsy who underwent video-EEG monitoring), but the incidence in the field might be underestimated [3]. It can have devastating consequences, since IA may provoke sudden loss of muscle tone, causing traumatic falls. It is likely that syncope due to epilepsy is even more hazardous than syncope due to vasovagal mechanisms, as IA is typically preceded by focal seizures impairing awareness. As a result, subjects are not warned by the symptoms of an impending faint and consequently do not anticipate the fall. IA therefore necessitates an aggressive treatment, especially since short-term recurrence risk is high [4]. Those refractory to conventional epilepsy treatment could benefit from pacemaker implantation [5]. To optimize management of IA, it is important to increase awareness among neurologists and cardiologists.

Sanchez-Borque and colleagues presented seven cases with a definite diagnosis of IA [6]. The ictal asystolic events were recorded during video-EEG and showed an RR interval over 3 s, due to either sinus pause ($n = 6$) or paroxysmal atrioventricular block ($n = 1$). Five cases were previously diagnosed with focal seizures with impaired awareness and presented with recurrent seizures and sudden falls. The two remaining cases revealed asystole during cardiac monitoring, without suspicion of epilepsy at that time. A pacemaker was implanted but failed to prevent future events. Subsequent video-EEG recordings of these episodes unveiled the diagnosis of focal epilepsy. Simultaneous pacemaker activation provided a final proof of IA.

IA usually starts more than one year after epilepsy onset, but earlier onset has also been described [7]. It may be difficult to diagnose IA in these early-onset cases, since epilepsy might not yet be suspected, as illustrated by the two cases mentioned above. In those with recurrent syncope without previous diagnosis of epilepsy, the clinician should search for specific clues. IA events are typically initiated by focal seizures, usually characterized by temporal lobe involvement [3]. It is hard to distinguish symptoms and signs of temporal lobe epilepsy from syncope, since both paroxysmal events may present with pallor, oral automatisms, sweating and staring [2]. Probably the most helpful clues for focal epilepsy include the presence of postictal confusion, the onset of symptoms in supine position (making a vasovagal cause unlikely) or the occurrence of longer lasting episodes without syncope, as presyncope usually lasts <1 min [8]. Long term recordings in those presenting with IA indicate that not all focal seizures are accompanied by asystole [3,4].

To confirm IA diagnosis, Sanchez-Borque and colleagues suggest withdrawal of anti-seizure medication and long-term ECG-Holter to record the event when suspicion is high. We would not favor such an approach as medication withdrawal is not without risk in people with epilepsy. In our opinion, this should only be considered if the epilepsy diagnosis is uncertain. In that case long-term video-EEG recording would be more appropriate to confirm or rule out the diagnosis of epilepsy. In those with a definite or highly likely diagnosis of epilepsy and a suspicion of IA, implantable loop recorders may help to document subsequent episodes of asystole.

Pacemaker implantation may prevent complications of IA [5]. In some cases syncope will disappear following pacemaker implantation, but a contrasting scenario is also possible. Different mechanisms of syncope in IA have been identified; it can be provoked by cardio-inhibition, vasodepression or a combination of both [1,9]. In cases where vasodepression predominates, the benefit of cardiac pacing may be limited. This scenario is important to consider, since pacemaker implantation does not have a negligible risk.

All reported cases of ictal asystole (IA) were self-limiting and thus contrast with the postictal asystole that is associated with sudden unexpected death in epilepsy (SUDEP) [3]. It is even suggested that cerebral hypoperfusion due to syncope favors seizure termination in IA [3,10]. The greatest risk of IA is the associated traumatic falls, due to sudden loss of muscle tone. Controlled prospective studies on IA are still lacking. Available evidence suggests that apart from pacemaker implantation,

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anti-seizure medications or other epilepsy treatments (e.g. epilepsy surgery) could all prevent complications of IA. The selection of choice should depend on various factors, including the chances of seizure recurrence, the impact and length of the asystole, and whether the cardio-inhibition is the dominant mechanism provoking syncope [5]. Increasing awareness among neurologists and cardiologists of the hidden ties between brain and heart may facilitate early IA diagnosis and help to prevent complications.

Conflict of interest

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