Case Report

Prevention of syncope and convulsions in a patient with severe cardio-inhibitory type Vasovagal syncope by conventional single chamber ventricular pacing.

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Abstract

Vasovagal syncope is one of the reflex syncope's which is commonly seen in children. Generally, symptoms are self-limiting and most patients can be managed conservatively with physical maneuvers and attention to good hydration. The two mechanisms described are cardio-inhibitory type, which is due to a sudden fall in the heart rate and the vaso-depressor type where there is a precipitous drop in blood pressure. Some patients have combination of both. Though pacemaker therapy has been used to treat sever vasovagal syncope, particularly where the mechanism is cardio inhibitory, this application is still controversial. If pacing is attempted what is recommended is closed loop stimulation (CLS) or at least a rate drop response dual chamber pacing. Conventional single chamber pacing is not generally considered to be effective. In this case, we report a patient who symptomatically responded to conventional single chamber ventricular pacing.

Introduction

Vasovagal syncope is one of the commonest causes of transient loss of consciousness (TLOC) in children [(1)]. Epilepsy is also a very common cause and it is sometimes difficult to differentiate, leading to a situation where some patients are misdiagnosed and patients with VVS are treated with anti-epileptic drugs. We describe a case of a child presenting with convulsions who was eventually diagnosed with Vasovagal syncope (VVS) as it's cause. The convulsions were due to prolonged asystole and subsequent hypoxia leading to a full blow generalized seizure. It was only the high suspicion we had that led us to chase after a diagnosis of VVS. We treated her successfully with a permanent pacemaker.

Case report

A 10 year old school girl was referred by a paediatric neurologist to the cardiac electrophysiology unit of the National Hospital of Sri Lanka with a history of convulsions for the last 5 years, not responding to anti-convulsant therapy.

The first episode appeared at the age of 5 years. The child had attended the vaccination clinic for DT and soon after vaccination had a sudden fall. Child had been pale and floppy and had lost consciousness. In about 1 minute she had developed a generalized tonic clonic seizure. She had recovered spontaneously after about 5minutes.The second episode appeared at the age of 7 years, while watching her mother having her blood drawn for a blood test.

Third and fourth episodes were at school and had occurred while standing during assembly. During each of these episodes, she has had short lived convulsions with spontaneous recovery within a few minutes. During the clinic visit, while seated, waiting to be seen, she became pale, fell and had a classical generalized tonic clonic seizure.

The resting ECG was normal and she had a normal 2D echo scan. Twenty-four hour Holter monitoring showed sinus rhythm throughout.

We suspected the possibility of Vasovagal syncope in view of the circumstances in which the episodes of syncope occurred, the pallor and floppy nature associated at the onset of the episodes and the ineffectiveness of anti-epileptic therapy in preventing episodes.

To confirm the diagnosis, we proceeded to do a Head up Tilt Table Test using the New-Castle protocol [(2)] on 28th February 2013.

Five minutes into the test, her heart rate increased from a resting of 86 bpm to 124 bpm. Then she complained of head-ache and feeling funny. At this point there was a rapid drop in the heart rate with onset of syncope. The tilt table was rapidly lowered to the resting position by which time she had sinus arrest. Though her legs were elevated and calf muscles massaged, sinus arrest persisted and she developed a generalized convulsion. Normal rhythm reappeared following repeated cardiac massage (figure1).

We concluded that the convulsions were due to the long period of hypoxia caused by the prolonged asystole during Vasovagal syncope.

It was decided to implant a pacemaker to prevent the prolonged asystole. However we did not have a pacemaker with rate drop detection function, which is the ideal type of pacemaker for preventing syncope in VVS[3] as the patient could not afford to purchase one. The only pacemaker we could offer her was a single chamber pacemaker (which was available in the government sector).

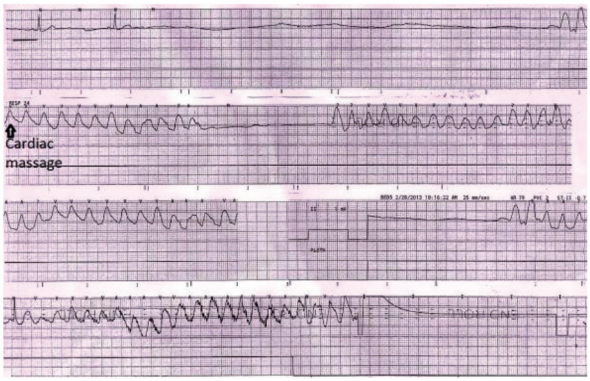

Figure 1: Prolonged asystole following tilt. Patient developed a generalized convulsion

We implanted a single chamber pacemaker with a right ventricular active fixation lead on 11th of March 2013. The mode was kept at VVI with a lower rate of 60bpm. The anti-epileptic drugs were discontinued. After implantation the child had two episodes of near syncope but was not associated with fits. We repeated the tilt test, using the same protocol on 29th August 2013.

During the 6th minute of tilting, the heart rate started dropping from 110bpm with onset of pre-syncope. However as the heart rate dropped further pacing beats appeared on the monitor (figure 2). Patient was feeling funny, but did not become syncopal and did not have convulsions.

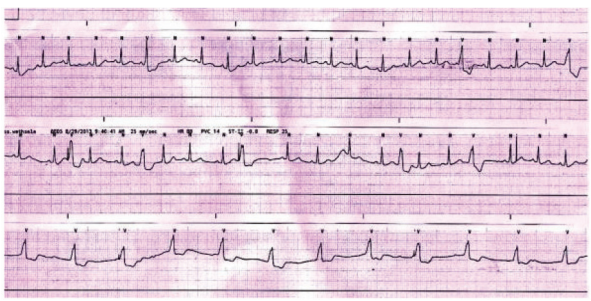

Figure 2 : ECG during Tilt, post pacemaker implantation

Discussion

Pacing in VVS is controversial. Some of the earlier studies (VSP1)3 showed benefit of pacing in reducing the episodes of syncope. This was confirmed, at least inpatients >40yrs by the ISSUE 3 study [4]. When comparing the mode of pacing it has been found that dual chamber pacing is superior to single chamber pacing in the prevention of syncope. The best efficacy was found using rate drop response dual chamber pacemakers [5]. Our aim was not to prevent syncope but to prevent convulsions which we attributed to cerebral hypo-perfusion and hypoxia. We confirmed that this was achieved by the clinical response and the result of the HUTT following pacemaker implantation. Though single chamber ventricular pacing has not been documented to prevent syncope in VVS, this case report shows that it helps prevent more serious consequences in severe cardio-inhibitory VVS.

References

1. *Connolly SJ, Sheldon R, Roberts RS, Gent M. North American Vasovagal Pacemaker Study. J Am Coll Cardiol. 1999 Jan;33(1):16-20.*
2. *Kenny R A , O'Shea D, Parry S W. The Newcastle protocol for head-up tilt table testing in the diagnosis of vasovagal syncope, carotid sinus hypersensitivity and related disorders. Heart 2000;83:564-569.*
3. *Sheldon R, Koshman M, Wilson W, et al. Effect of dual-chamber pacing with automatic rate-drop sensing on recurrent neurally medicated syncope. Am J Cardiol. 1998;81:158–162.*
4. *Brignole Michele, Menozzi Carlo, Moya Angel, Andresen Dietrich, et al. Pacemaker Therapy in Patients With Neurally Mediated Syncope and Documented Asystole; Third International Study on Syncope of Uncertain Etiology (ISSUE-3). Circulation. 2012; 125: 2566-2571.*
5. *Ammirati F, Colivicchi F, Toscano S, et al. DDD pacing with rate drop response function versus DDI with rate hysteresis pacing for cardioinhibitory vasovagal syncope. Pacing Clin Electrophysiol. 1998;21:2178–2191.*