

Vasovagal syncope successfully treated with an atrial leadless pacemaker



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Introduction

Syncope is defined as a complete, transient loss of consciousness with rapid spontaneous recovery resulting from a presumed mechanism of cerebral hypoperfusion. Reflex syncope, a common form of vasovagal syncope (VVS), is associated with vasodilatation, cardioinhibitory response or both.¹ It is typically nonfatal, but if it recurs frequently, it can lead to injury and significantly affect quality of life. A tool recommended for diagnosing the etiology of syncope is an Implantable Loop Recorder (ILR).² Some options for management include increased salt and fluid intake, counterpressure maneuvers, certain medications (eg, midodrine, fludrocortisone, selective serotonin reuptake inhibitors), and in some cases, implantation of a pacemaker.

Case report

We present a 31-year-old female patient with hypothyroidism, seizure disorder on lamotrigine and levetiracetam, and recurrent lightheadedness with multiple episodes of syncope leading to facial trauma. Episodes occurred while sitting, standing, at home or at work, and when feeling stressed. She refused tilt table testing. Holter monitoring demonstrated minimally symptomatic pauses up to 3.5 seconds in duration. A Biomonitor III ILR was implanted. During an episode of syncope, the patient demonstrated junctional rhythm followed by a 9.5-second pause. As her symptoms were affecting quality of life, a shared decision-making approach was used, and an Abbott AVEIR leadless, single chamber atrial pacemaker was implanted to allow for AV synchrony in a patient without complete heart block. Programming was atrial, atrial, inhibited mode at a rate of 40 bpm.

The patient returned to our office for routine follow-up. She cited a single episode of significant lightheadedness

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KEY TEACHING POINTS

- Vasovagal syncope can be associated with a cardioinhibitory response.
- Management of a vasovagal cardio-inhibitory response may include pacemaker therapy.
- Ventricular leadless pacemakers have been used to manage vasovagal syncope with cardio-inhibitory response.
- Atrial leadless pacemakers can be used if the cardio-inhibitory response is sinus node dysfunction.
- Combining an implantable loop recorder with a leadless pacemaker can effectively determine the efficacy of pacing for vasovagal syncope.

but no syncope. The AVEIR pacemaker interrogation showed appropriate sensing and pacing thresholds. Atrial pacing occurred <1%. ILR interrogation correlating to her symptoms demonstrated sinus tachycardia preceding bradycardia, followed by atrial pacing for 17 seconds that was time-stamped and correlated to symptoms (Figure 1). The brief lightheadedness was tolerable, and the patient had no syncope. She expressed satisfaction since her current status as recurrent syncope had resolved, which has markedly improved her quality of life.

Discussion

Pacemaker implantation is generally not recommended for VVS, especially in younger patients. The 2017 ACC/AHA/HRS guidelines for managing syncope have a 2B recommendation for dual chamber pacemaker implantation for those older than 40 years with demonstrated symptomatic pauses >3 seconds. There are different pacemaker algorithms available for VVS management, including rate-drop algorithm and hysteresis, but most efficacious may be devices using the closed-loop stimulation algorithm.^{3,4} Recent evidence suggests that single-chamber ventricular leadless pacemakers may be an effective pacing alternative.^{5,6} To date, there are no studies evaluating single-chamber leadless atrial

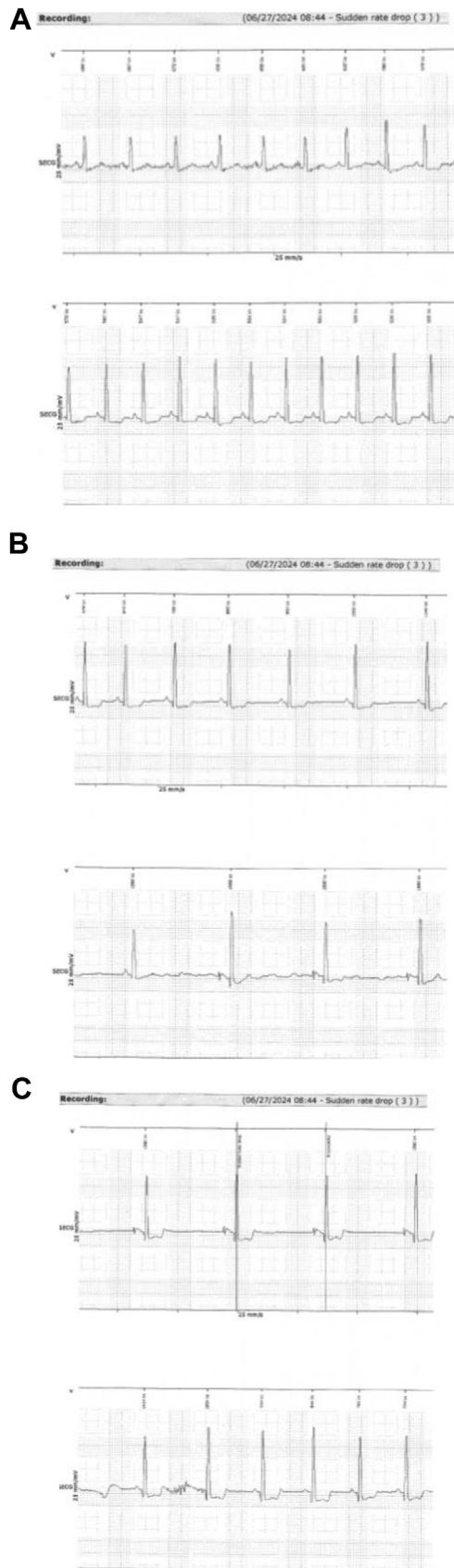


Figure 1 A: Episode starts with tachycardia. B: Heart rate slows, leading to atrial pacing. C: Episode resolves and back to sinus rhythm.

pacemakers. Since cardioinhibitory responses can occur with complete heart block, and not only sinus arrest, this may be a reasonable alternative. Our patient, who is younger than 40 years old with VVS, benefits from treatment with a leadless atrial pacemaker, proven with ILR data to correspond to an episode showing atrial pacing aborting cardioinhibitory response.

Conclusion

Although some evidence supports ventricular leadless pacemakers for patients with VVS, some patients may benefit from having an atrial, single-chamber leadless pacemaker, including our patient. Leadless pacemakers have fewer associated complications compared with transvenous pacemakers, and battery longevity is greater. More research, including randomized controlled studies, needs to be conducted to further evaluate leadless pacemakers as an indication for VVS.

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