

## Use of Ivabradine in Postural Orthostatic Tachycardia Syndrome

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### Abstract

Postural orthostatic tachycardia syndrome (POTS) is characterized by inappropriate increase in heart rate on assuming upright position from a supine position without a necessary drop in blood pressure. Etiology of this condition is complex and multifactorial. Autonomic dysfunction,<sup>1</sup> hypovolemia,<sup>2</sup> hyper responsiveness of beta adrenergic receptors<sup>3</sup> with associated elevations of plasma norepinephrine levels have been implicated as underlying pathophysiologic mechanisms. Beta blockers have previously been used to treat this condition. Ivabradine which selectively inhibits If ion current in the sino atrial node, has been reported to be useful in patients with POTS.<sup>4,5</sup> We present one further such case of POTS successfully treated by Ivabradine.

### Case report

A previously fit twenty-five year old staff nurse was referred to the cardiology clinic with recurrent pre-syncope and syncopal episodes over 18 months. Her symptoms were described as a sharp pain felt on the left side of the head followed by palpitations in her chest. Immediately following these she would feel light-headed and then collapse, losing consciousness for a few seconds. Her past medical history included essential hypertension for which she took Ramipril and Bisoprolol. She denied smoking or recreational drug use and consumed minimal alcohol. There was no family history of relevance.

Clinical examination revealed her to be euthyroid and well. She was in sinus tachycardia with a heart rate of 100bpm and a blood pressure of 140/80mmHg whilst seated, rising to 160/90 on standing. Her heard sounds were normal and there were no carotid bruits or signs of heart failure. Respiratory, Abdominal, and Neurological examination were unremarkable.

Her Echocardiogram and electrocardiogram were both normal. Holter monitor revealed sinus tachycardia which was, at times, associated with the patient's symptoms. She proceeded to a tilt table test, including GTN provocation. During this she was found to again have a sinus tachycardia of 146bpm with tilting but no reproduction of symptoms. As she was leaving the tilt table room she collapsed in association with a sinus tachycardia but no drop in her blood pressure. She was admitted to hospital and was noted to collapse on the ward several times a day in association with a sinus tachycardia on the cardiac monitor. There was no detectable abnormality in her blood pressure during the collapses. A CT scan of the brain was found to be normal. She was started on Ivabradine 5 mg twice daily following which her symptoms improved. She had a mean heart rate around 90 beats per minute whilst on Ivabradine. The patient was seen in clinic three weeks later where she was noted to be feeling well with no further syncopal episodes.

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## Conclusion

Our present case would add to the existing body of evidence for use of Ivabradine in POTS. Randomized control trials are required to look in to the efficacy of this new treatment for a relatively complex medical condition.

## References

1. Low PA, Opfer-Gehrking TL, Textor SC, et al. Postural tachy-

cardia syndrome (POTS). *Neurology* 1995;45(supplement 5):S19–25.

2. Fouad FM, Tadena-Thome L, Bravo EL, Tarazi RC. Idiopathic hypovolemia. *Ann Intern Med* 1986;104:298–303.

3. Bonyhay I, Freeman R. Sympathetic nerve activity in response to hypotensive stress in the postural tachycardia syndrome. *Circulation* 2004;110:3193–8.

4. Khan S, Hamid S, Rinaldi C. Treatment of inappropriate sinus tachycardia with ivabradine in a patient with postural orthostatic tachycardis syndrome and a dual chamber pacemaker. *Pacing Clin Electrophysiol* 2009; 32(1): 131-3.

5. Ewan v, Norton M, Newton JL. Symptom improval in postural orthostatic tachycardia syndrome with the sinus node blocker ivabradine. *Europace* 2007; 9(12):1202.