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Case Report Open Access

Stellate Ganglion Block in the Management of Recurrent Ventricular Tachycardia

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Abstract

Recurrent ventricular arrhythmias are clinically challenging cases. Patients frequently have been trialed on a variety of antiarrhythmic medications, and symptomatic cases ultimately require invasive interventions with the utilization of multiple resources. In this report, we present a 61-year-old African American male admitted to an intensive care unit with nonischemic cardiomyopathy and persistent hemodynamically unstable ventricular tachycardia successfully managed with a bilateral stellate ganglion block. He had previously been trialed on a number of antiarrhythmic medications, cardioversions, and ablations. While not commonly considered first-line therapy, stellate ganglion blocks are a promising intervention in the management of incessant ventricular tachycardia. Larger studies will be required to determine a possible role of stellate ganglion blocks in the treatment of ventricular arrhythmias.

Keywords: Arrhythmias; Cardiomyopathy; Tachycardia

Introduction

Ventricular arrhythmias include ventricular premature beats, monomorphic or polymorphic ventricular tachycardia (VT), and ventricular fibrillation (VF). While the etiology of ventricular arrhythmias are broad and diverse, some common causes include underlying structural disease due to myocardial damage or injury including ischemia, neurohormonal factors, drug toxicity, electrolyte disturbances, embolic phenomenon, acidosis, and irritation of the heart from central lines. On electrocardiogram, ventricular rhythms are defined by a wide QRS wave with AV dissociation and/or an absence of P wave. Patients with ventricular arrhythmias can often present in cardiac arrest with hemodynamic instability, syncope, or sustained palpitations. Though the definition is varied, an electrical or arrhythmic storm refers to multiple occurrences of VT or VF over a short period of time. Electrical storms are most 1 commonly found in patients with underlying structural heart disease, but other etiologies include metabolic derangements, drug toxicity, and acute myocardial ischemia. The first step in managing hemodynamically unstable arrhythmias includes following Advanced Cardiac Life Support (ACLS) guidelines. This is 2 followed by pharmacological treatment and often, invasive interventions. While catheter ablations, coronary revascularization, and insertion of left ventricular assist devices or automatic implantable cardioverter-defibrillator (ICD) are commonly considered, stellate ganglion blocks (SGB) have also previously been utilized in the management of recurrent ventricular tachycardia. In this study, we report a case of a patient with recurrent VT successfully managed with a SGB.

Case Report

The patient is a 61-year-old African American male with a prior medical history of hypertension, non-ischemic cardiomyopathy with a left ventricular ejection fraction of 10%, and ventricular tachycardia (VT). He otherwise presented with a history of diabetes mellitus type II, prior cerebrovascular accident without residual deficits, obesity, gastroesophageal reflux disease, diverticulosis, and hyperlipidemia. The patient had undergone ICD placement as well as three rounds of radiofrequency ablations over the past year after receiving several ICD shocks with persistent dyspnea and syncopal episodes. The second ablation resulted in a complete heart block requiring an upgrade to a biventricular lead placement. He had no further episodes of VT after his most recent ablation two months prior to presentation. At this time, patient had been undergoing evaluation for left ventricular assist device (LVAD) versus heart transplant.

He initially presented to the emergency department from an outpatient clinic with chest pain and left-sided weakness where he underwent diagnostic testing for concern of cerebrovascular accident, which returned negative. He was subsequently transferred to the cardiology step down unit for medical optimization prior to LVAD placement and left ventricular cryo-ablation. Intraoperatively, patient developed his first episode of ventricular tachycardia during this stay, which was managed with boluses of lidocaine and amiodarone as well as defibrillation. Patient's hospital course was then extended by multiple complications including surgical site hemorrhage, right ventricular failure, and embolic stroke requiring admission to the intensive care unit.

On post-operative day 7, patient developed ventricular tachycardia with a heart rate in the 200 s. He was internally defibrillated by ICD to a persistent slower wide complex rhythm. Electrophysiology was consulted, and he was started on and titrated off multiple anti-arrhythmic medications, including mexelitine, amiodarone, quinidine, and lidocaine. Patient received multiple trials of cardioversion resulting in transient AV-paced rhythm with eventual return to slow VT. Throughout this time, he remained intubated and hemodynamically unstable requiring pharmacologic vasopressor support. Finally, a SGB was recommended as a precursor to

sympathectomy and the inpatient Acute Pain Service team was contacted [1].

The pain service performed a bilateral SGB at bedside under fluoroscopic and ultrasound guidance. A 22 gauge, 2 inch Stimuplex needle was advanced until bony contact was made at the mid-point of the transverse process at C6. Ultrasound guidance was used to avoid any major vascular structures. Next, 1 mL of contrast dye was injected showing good spread adjacent to the transverse process with no evidence of intravascular or intrathecal spread. Then, 6 ml of 1% lidocaine was injected to each side in 2 mL aliquots after negative aspiration and continuous contact with os. The needles were then removed [2].

Since the procedure, patient did not experience any further episodes of sustained VT. He did experience a brief episode, less than a minute, of VT prior to a tracheostomy placement that was self-limited without intervention. Per cardiac electrophysiology, a bilateral cardiac sympathectomy was recommended if patient redeveloped recurrent VT given his response to SGB. However, patient was discharged to inpatient rehab on oral antiarrhythmic medications.

Discussion

The stellate ganglion, also known as the cervicothoracic ganglion, encompasses the fusion of inferior cervical ganglion and first thoracic sympathetic ganglion. As part of the cervical sympathetic chain, the stellate ganglion provides sympathetic output to the head, neck, upper extremity, and, importantly for our case presentation, the intrathoracic structures. While multiple other sympathetic ganglia provide innervation to the heart, the stellate ganglion block is targeted in the management of ventricular arrhythmias because it provides adequate denervation to the ventricle while avoiding significant complications associated with more cranial blocks [3].

Indications for a SGB include patients with complex regional pain syndrome (CRPS) type 1 and 2, postherpetic neuralgia, intractable angina, post-traumatic stress disorder, hyperhidrosis, phantom limb pain, and hot flushes. Traditionally, SGBs [4] were performed by palpation of the anterior transverse process of C6, Chassaignac tubercle, or C7 between the sternocleidomastoid muscle and trachea while pushing the carotid artery laterally. Radiographic and ultrasound imaging have now become widely used in guidance for performance of this procedure. In a study of 44 patients, patients with poststroke CRPS who underwent ultrasound-guided SGBs had improved visual analog scores compared to their blind-SGB counterparts [5].

In this case study, both ultrasound and fluoroscopic imaging techniques were utilized in the guidance of a SGB with no further episodes of recurrent VT. Though there is an absence of large randomized controlled trials, a systematic review of 3374 publications found 38 patients with electrical storm treated with SGB [6].

Similarly to our patient, 63.2% of these patients had cardiomyopathy and 97.4% had previously been trialed with antiarrhythmics. 35 of the 38 patients were shown to have a good response, and the study showed a decrease in number of shocks and arrhythmia burden after SGB. Another systematic review of 35 patients from 22 case series who had failed pharmacologic therapy showed decreased burden in the number of ventricular arrhythmia episodes and defibrillations from 24 hours before and after SGB. This was shown regardless of the etiology of cardiomyopathy, type 7 of ventricular rhythm, and degree of heart dysfunction [7].

Conclusion

While there is a lack of quality evidence, SGB may be a promising modality in the management of recurrent, pharmacologic-resistant ventricular tachycardia. Larger, randomized-controlled studies will be needed to better understand and confirm the role of SGB therapy in the management of persistent ventricular arrhythmias.

References

1. Israel CW, Barold SS (2007) Electrical storm in patients with an implanted defibrillator: A matter of definition. Ann Noninvasive Electrocardiol 12: 375-382.
2. Al-Khatib SM, Stevenson WG, Ackerman MJ, Bryant WJ, Callans DJ, et al. (2017) AHA/ACC/HRS Guideline for management of patients with ventricular arrhythmias and the prevention of sudden cardiac death: a report of the american college of cardiology/american heart association task force on clinical practice guidelines and the heart rhythm society. Heart Rhythm 72: 91-220.
3. Witt CM, Bolona L, Kinney MO, Moir C, Ackerman MJ, et al. (2017) Denervation of the extrinsic cardiac sympathetic nervous system as a treatment modality for arrhythmia. Europace 19: 1075-1083.
4. Gunduz OH, Kenis-Coskun O (2017) Ganglion blocks as a treatment of pain: current perspectives. J Pain Res 10: 2815-2826.
5. Yoo SD, Jung SS, Kim HS, Yun DH, Kim DH, et al. (2012) Efficacy of ultrasonography guided stellate ganglion blockade in the stroke patients with complex regional pain syndrome. Ann Rehabil Med 36: 633-639.
6. Meng L, Tseng CH, Shivkumar K, Ajijola O (2017) Efficacy of stellate ganglion blockade in managing electrical storm: a systematic review. JACC Clin Electrophysiol 3: 942-949.
7. Fudim M, Boortz-Marx R, Ganesh A, Waldron NH, Qadri YJ, et al. (2017) Stellate ganglion blockade for the treatment of refractory ventricular arrhythmias: A systematic review and meta-analysis. J Cardiovasc Electrophysiol 28: 1460-1467.