



Case Report

Cervical sympathetic blockade for the management of electrical storm



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Abstract A 75-year-old man presented with dizziness and fatigue secondary to ventricular and supraventricular arrhythmias. He underwent an elective ablation but continued to suffer from ventricular tachycardia with cardiovascular instability despite antiarrhythmic therapy with multiple agents. The patient continued to develop episodes of ventricular tachycardia and an episode of ventricular fibrillation.

Electrical storm encompasses a situation of cardiac instability which may present as several episodes of ventricular tachycardia or ventricular fibrillation in a short period. We performed an ultrasound-guided left stellate ganglion block at the bedside which resulted in abolition of electrical storm. The patient demonstrated sinus rhythm with episodes of sinus tachycardia. Left stellate ganglion block has proven to be a successful mode of treatment for those patients with ventricular tachyarrhythmia resistant to medical management or those who fail atrioventricular node ablation. Ultrasound-guided left stellate ganglion block is a valuable and effective means to providing sympathectomy in the management of electrical storm or ventricular tachyarrhythmias. © 2016 Elsevier Inc. All rights reserved.

1. Introduction

Electrical storm encompasses a situation of cardiac instability which may present as several episodes of ventricular tachycardia or ventricular fibrillation in a short period. Electrical storm occurs in approximately 25% of patients with implantable cardiac defibrillator within 3 years [1]. It is well known that increased cardiac sympathetic activity is seen in patients with a history of ventricular arrhythmias [2]. Most of the sympathetically mediated innervation to the head, neck, and upper extremity is through pathways via the stellate ganglion. This ganglion is also implicated in sympathetically mediated pain syndromes. Furthermore, ventricular dysrhythmias arise partly secondary to a disparity in stellate ganglion activity [3].

We describe the use of bedside ultrasound-guided left stellate ganglion block in the management of ventricular tachycardia in a 75-year-old male patient.

2. Case

A 75-year-old Hispanic man presented with dizziness and fatigue secondary to multiple episodes of monomorphic ventricular tachycardia. His medical history consisted of ischemic cardiomyopathy with automatic implantable cardioverter defibrillator, coronary artery disease with 5-vessel coronary artery bypass graft, multiple percutaneous cardiac interventions, atrial fibrillation managed with anticoagulation, and hypertension. He failed management with automatic implantable cardioverter defibrillator and was admitted for an elective ablation procedure.

He underwent basal anterolateral and lateral endocardial ablation of ventricular tachycardia. Despite ablation of identified

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arrhythmogenic sites, he continued to demonstrate ventricular tachycardia. During one of these episodes, he developed respiratory failure which necessitated intubation. Subsequently, his condition was treated medically with multiple antiarrhythmic agents including intravenous formulations of mexiletine, procainamide, metoprolol, sotalol, amiodarone, and lidocaine. His hospital stay was complicated by drug-resistant pneumonia. Throughout his hospital stay, he continued to demonstrate incidents of sustained and nonsustained monomorphic and polymorphic ventricular tachycardia (see Fig. 1), with one episode turning into ventricular fibrillation requiring cardiopulmonary resuscitation and anti-tachycardia pacing.

Twenty-seven days after the first ablation, a repeat ablation was attempted but once again unsuccessful. The following day, as a last resort to manage his condition, the interventional pain management team was consulted in regard to performing a sympathectomy in the form of a left stellate ganglion block. After successful block and continuous nerve catheter placement for 2 days, the patient had only 2 episodes of ventricular tachycardia for those next 48 hours. However, his condition continued to deteriorate as his pneumonia worsened and sepsis ensued. Six days after successful left stellate ganglion block, the patient's family decided to plan for comfort care and the patient died.

3. Left stellate ganglion block

After obtaining appropriate informed consent from the health care proxy, the patient underwent a successful left stellate ganglion block at the bedside. This patient was deemed

unfit for transport to the fluoroscopy suite or to the operating theater. The patient had already been intubated secondary to respiratory failure and was sedated. We decided to perform this block at the bedside using ultrasound-guided technique combined with anatomical landmarks. The patient was placed in a supine position in his bed, and basic monitors were placed including pulse oximetry, arterial blood pressure, and 5 limb electrocardiogram leads. The left neck area was prepped and draped with strict aseptic technique. Next, the head of the patient was positioned to his right. The cricoid cartilage was identified, representing the C6 vertebral body. A linear ultrasound probe was used in identification of Chassaignac's tubercle, the left carotid artery, and the transverse process of C7. Scanning was then performed to identify the prevertebral fascia and the longus coli muscle near which the ganglion resides (see Fig. 2).

Once identified, a 1% lidocaine skin wheal was made using a 25-gauge needle at the entry site. This was followed by an 18-gauge blunt tip peripheral nerve block needle using ultrasound and direct visualization with an out-of-plane approach to the anterior lateral aspect of the C7 vertebral body. After negative aspiration, 10 mL of 0.25% bupivacaine was easily injected at 5-mL increments with appropriate spread and non-vascular uptake. The needle was then flushed with 3 mL of normal saline to verify optimal location for catheter placement. A 20-gauge catheter was then advanced and positioned to 9 cm at the skin. Next, a sterile dressing was applied. There were no untoward complications and the patient tolerated the procedure well. We were unable to accurately identify a Horner syndrome because the patient was sedated; however, using peripheral sensors, we did note an increase in temperature of the left upper extremity. After a stellate ganglion block, skin

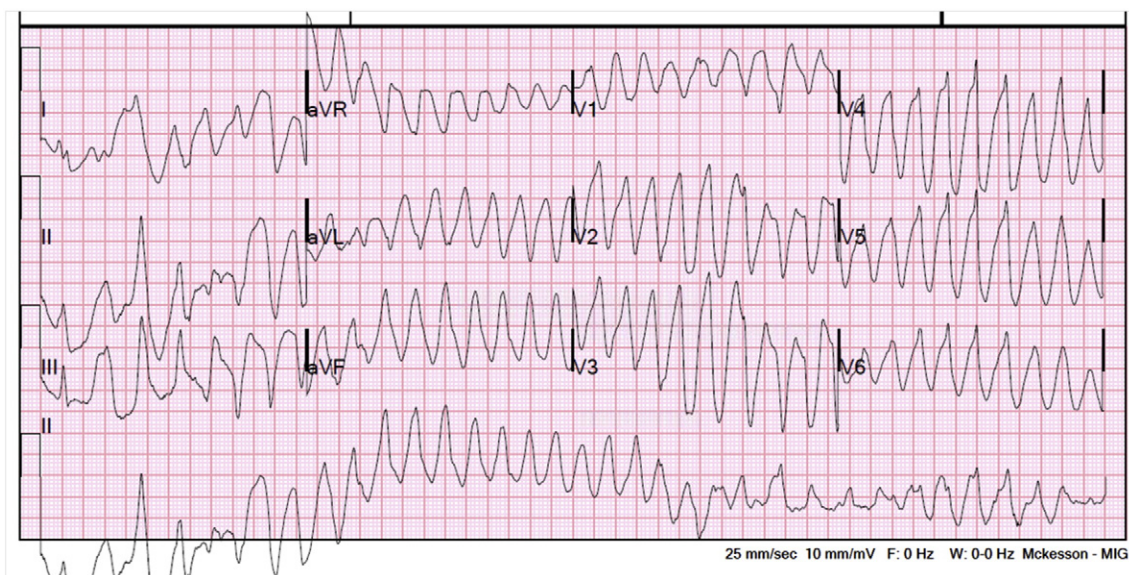


Fig. 1 Electrocardiogram demonstrating polymorphic ventricular tachycardia. Image courtesy of: <http://hqmeded-ecg.blogspot.com/2013/10/polymorphic-ventricular-tachycardia.html><http://hqmeded-ecg.blogspot.com/2013/10/polymorphic-ventricular-tachycardia.html>.

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