



Case Report

Amiodarone and Lidocaine Infusion for Treatment of Ventricular Tachycardia Storm in an Emergency Setting: Case Report

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Abstract

This report describes a case of ventricular tachycardia (VT) storm managed in the emergency department prior to transfer for automatic implantable cardioverter-defibrillator (AICD) placement. VT storm is associated with significant in-hospital and 6-month mortality, necessitating emergent stabilization and definitive secondary prevention. While ACLS and antiarrhythmic drugs (AAD) are the mainstays of emergency management, early referral is indicated for ICD placement, catheter ablation, and/or sympathetic cardiac denervation. In the setting of sustained or recurrent VT (including VT storm), amiodarone and/or lidocaine can be administered not only as boluses but also as infusions. This strategy can stabilize the patient for transfer (if needed) and avoid escalation to intubation and sedation for central sympathetic blockade, which would necessitate admission to intensive care.

Keywords: Ventricular Tachycardia; Ventricular Tachycardia Storm; VT Storm; Electrical Storm; Amiodarone; Lidocaine

Introduction

Ventricular tachycardia (VT) Storm is a serious condition associated with high mortality. Poor patient outcomes have been observed since VT storm was first described in 1995. Rapid assessment, ACLS, correction of reversible causes, and antiarrhythmic drugs (AAD) are essential for patient stabilization prior to referral or transfer for more definitive intervention. The use of amiodarone and/or lidocaine infusion are important tools of medical management to consider for use in the emergency setting. Herein, we describe a case resolved and stabilized with medical management in the ED prior to transfer for AICD placement.

Case Presentation

A 66-year-old male with a past medical history of AAA, COPD, atrial fibrillation, obesity, diabetes type 2, hypertension,

dyslipidaemia, and tobacco use presented to the emergency department with midstream and left axial chest pain that began at rest. 4 hours prior to presentation, the patient noticed a dull, achy pressure that progressively worsened and did not resolve with sublingual nitro-glycerine. During triage, the patient had a heart rate of 180 bpm with an EKG revealing monomorphic ventricular tachycardia (Figure 1). Work-up revealed electrolyte levels within normal limits and negative troponins. Following administration of 2 boluses of amiodarone, 2 shocks synchronized cardioversion, and 2g of magnesium, the patient temporarily entered sinus tachycardia for less than a minute before returning to monomorphic VT. After another shock was delivered, an amiodarone drip was initiated. Sustained monomorphic VT was observed, prompting administration of 200mg lidocaine. 15 minutes elapsed before lidocaine infusion was also initiated. Within 5 minutes, the patient returned to normal sinus rhythm (Figure 2). Altogether, the case took 90 minutes to resolve. A diagnosis of VT Storm was made, and the patient was transferred to an outside hospital for AICD placement (Figure 3). Previous pharmacological testing

(performed months prior) demonstrated inferolateral scarring with moderate peri-infarct, likely the arrhythmogenic source. At 1 month cardiology follow up, the patient underwent diagnostic catheterization and stent placement. Occlusions of the following arteries were observed: 30% mid LAD, 70% first diagonal and 100% second diagonal.

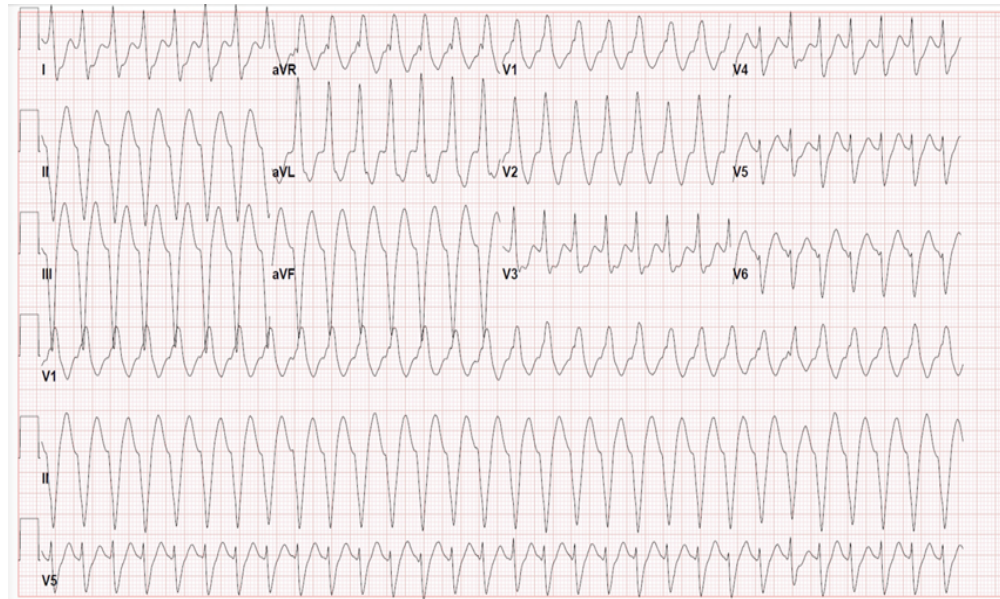


Figure 1: Initial EKG demonstrating monomorphic ventricular tachycardia.

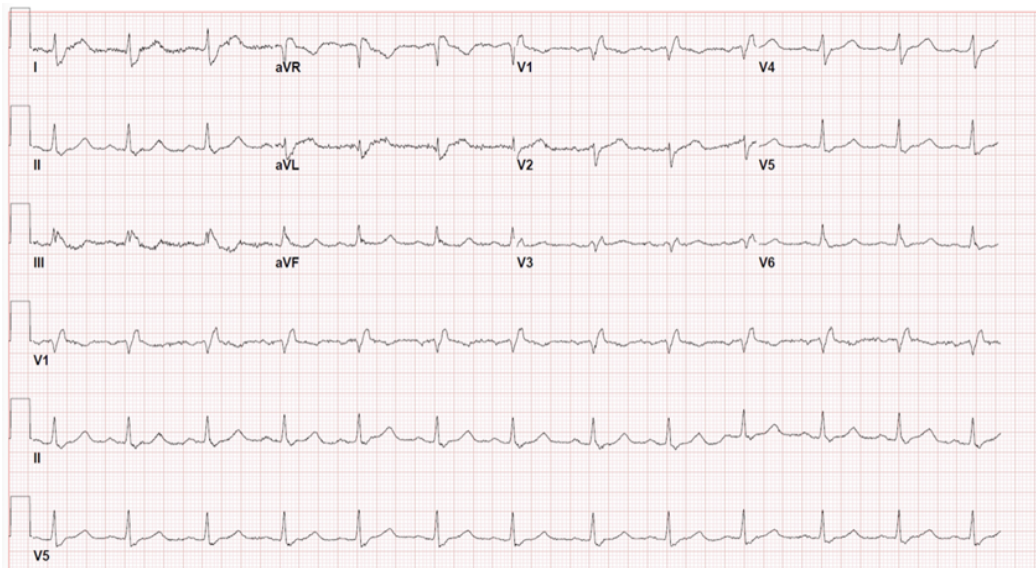


Figure 2: Follow-up EKG demonstrating return to normal sinus rhythm.

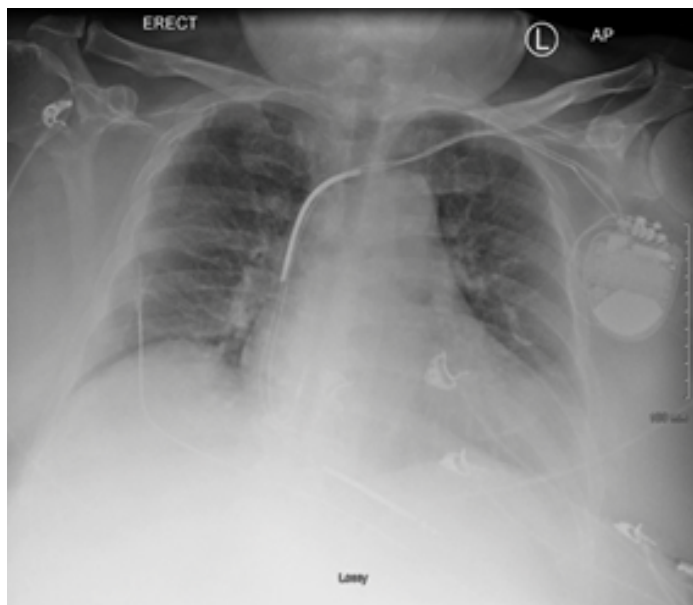


Figure 3: Patient Chest XR following placement of AICD.

Discussion

Ventricular Tachycardia (VT) Storm is a serious condition requiring multimodal intervention. The definition is largely empirical, with significant variability in the reported literature [1]. Originally described during the pre-ICD era (1995), it is defined as >2 hemodynamically stable or unstable episodes of VT within a 24-hour period [2]. The condition is further characterized by return of the VT rhythm immediately after termination, such as in the case above [3,4]. If AICD is present, VT storm is then defined as >3 ICD shocks or anti-tachycardia pacing events within the span of 24 hours [5]. Rapid morphology recognition is needed to identify potentially reversible causes [1]. The majority (up to 84%) of patients present with monomorphic VT, usually secondary to previous infarct [3,5]. Patients with either poly- or pleomorphic VT are more likely associated with reversible etiologies such as acute ischemia, electrolyte abnormalities, and medications (missed or proarrhythmic). Myocarditis and Hypertrophic Obstructive Cardiomyopathy (HOCM) may also contribute to polymorphic VT storm [6]. Clinical presentation can vary significantly, ranging from vague complaints (blurry vision and light-headedness) to chest pain or even cardiac arrest [6]. ACLS is the mainstay of emergency intervention if hemodynamic instability is present. Correction of reversible causes and ICD reprogramming should occur as necessary, in addition to medical management and synchronized cardioversion. If VT is sustained or returns following a brief interval, the diagnosis of VT storm can be made [1]. To minimize risk of poor outcomes, at this clinical juncture many clinicians will escalate care to catheter ablation, left sympathetic ganglion block, and/or sympathetic

cardiac denervation [7]. However, amiodarone and/or lidocaine infusion are medical management options that can be utilized prior to escalation. This is particularly relevant in emergency settings when interventional cardiology and/or cardiothoracic surgery services are not readily available. Antiarrhythmic infusion also bypasses the need for more invasive strategies such as central sympathetic blockade. As this intervention requires neuromuscular paralysis, sedation, intubation, and cooling, it would necessitate ICU admission⁴. Of note, patients receiving lidocaine infusion must be monitored for neurotoxic side effects [4]. Following ICD implantation for secondary prevention, early referral for catheter ablation is associated with improved long-term patient outcomes [3,8]. In the 2016 VANISH clinical trial, patients experienced decreased VT recurrence, fewer ICD shocks, and a long-term survival benefit if they received catheter ablation (vs. escalation of outpatient AAD therapy) [9]. In-hospital mortality can be as high as 19.5% [5]. 6-month mortality involves an additional 18% of patients, particularly those age >50 and with prior infarct⁵. Up to 46% experience VT recurrence at 6 months; patients with LVEF <30% are at greatest risk [5].

Conclusion

Patients without AICDs presenting with VT Storm require stabilization to avoid escalation of care involving more invasive procedures. Amiodarone and lidocaine may be administered as infusions in addition to boluses to achieve patient stabilization in the emergency setting.

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References

1. Kowlgi GN, Cha YM (2020) Management of ventricular electrical storm: a contemporary appraisal. *EP Europace*. 22: 1768-1780.
2. Kowey PR, Levine JH, Herre JM, Pacifico A, Lindsay BD, et al (1995) Randomized, double-blind comparison of intravenous amiodarone and bretylium in the treatment of patients with recurrent, hemodynamically destabilizing ventricular tachycardia or fibrillation. The Intravenous Amiodarone Multicenter Investigators Group. *Circulation* 92: 3255-3263.
3. Gao D, Sapp JL (2013) Electrical storm: definitions, clinical importance, and treatment. *Curr Opin Cardiol*. 28: 72-79.
4. Zaman J, Agarwal S (2021) Management of ventricular tachycardia storm. *Heart*. 107: 1671-1677.
5. Shah V, Vyas A, Dedhia A, Bachani N, Lokhandwala Y (2020) In-hospital and intermediate term outcome of ventricular tachycardia storm. *Indian Heart Journal*. 72: 299-301.
6. Kamboj R, Bunch AC, Bernstein RC, Counselman FL (2019) Ventricular tachycardia storm presenting as vague complaints to the emergency department. *Clin Pract Cases Emerg Med*. 3: 215-218.

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7. Sai Satish O, Vavilala SKR, Kaladhar B, Surya Satya Gopal P (2021) Multipronged approach to a patient with ventricular tachycardia storm. *Asian Cardiovasc Thorac Ann*. 29: 122-124.
8. Al-Khatib SM, Stevenson WG, Ackerman MJ, Bryant WJ, Callans DJ, et al (2018) 2017 AHA/ACC/HRS guideline for management of patients with ventricular arrhythmias and the prevention of sudden cardiac death: executive summary. *Circulation* 138: e210-71.
9. Sapp JL, Wells GA, Parkash R, Stevenson WG, Blier L, et al (2016) Ventricular tachycardia ablation versus escalation of antiarrhythmic drugs. *N Engl J Med*. 375: 111-121.