



Case Study Of Electrical Storm

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Abstract: Electrical storm is an increasingly common and life-threatening syndrome that is defined by ≥ 3 sustained episodes of ventricular tachycardia and/or ventricular fibrillation that necessitates appropriate shocks from an external or implantable cardioverter-defibrillator (ICD) within 24 hours. Electrical storm can manifest itself during acute myocardial infarction, in patient who has structural heart disease, an implantable cardioverter-defibrillator or an inherited arrhythmic syndrome. Electrical storm has a poor outcome. The effective management requires determining and correcting the underlying ischemia, electrolyte imbalances and or causative factors. Amiodarone and B-blocker, especially propranolol, effectively resolve arrhythmias in most cases. Nonpharmacological treatment, including radiofrequency ablation, can control electrical storm in drug-refractory patients. Patients who have implantable cardioverter-defibrillator may require drug therapy and device reprogramming. After the acute phase of electrical storm, the treatment should be focused towards treating cause such as heart failure therapy, coronary revascularization and preventing subsequent arrhythmias. [Frouk Elrashid Mustafa Omer, Mohammed Al-rasheed Mostafa Abueissa. **Case Study Of Electrical Storm.** *N Y Sci J* 2021;14(12):20-22] ISSN 1554-0200 (print); ISSN 2375-723X (online) <http://www.sciencepub.net/newyork>. 3. doi:10.7537/marsnys141221.03.

Keywords: Electrical Storm (ES), Ventricular Tachycardia (VT), Ventricular Fibrillation (VF)

Patient consent was obtained.

CASE PRESENTATION:

A 50-year-old Bangladeshi was brought by an ambulance complaining of heart racing, shortness of breath (SOB) and chest pain for 15 min. He is a known case of dilated cardiomyopathy, hypothyroidism and hypertension since 7 years. The condition was started suddenly with chest pain central, referred to interscapular region, dyspnea and palpation which remained for 15 min. According to the patient the palpation was irregular, fast and did not relief by straining. The patient denied syncopal attack associated with his condition. Patient was heavy smoker and denied tacking neither elicits drugs nor alcohol. He takes amlodipine (calcium channel blocker) 5mg tab, valsartan (Angiotensin II Receptor Blockers) 40mg tab, simvastatin 5mg, Aldactone (spironolactone) tab 100mg, Lasix (furosemide) 40mg tab and thyroxin 50 mg tab. No past family and surgical histories of medical importance. On time of examination, his blood pressure was 90/67 mmhg, pulse rate 200 beat per min respiratory rate 30, oxygen saturation on room air 96 and his temperature was 37. There were no abnormal findings on respiratory, abdominal and neurological examinations. Lab findings included the following: potassium level 3.7, Sodium 136, Magnism 2.3 Creatinin .09, Calcium level 9, CKMB 24, CPK68, Troponin positive and CBC within normal.

Management and outcome:

ECG electrocardiogram in emergency department showed ventricular tachycardia with heart rate 200. After successfully resuscitation with defibrillator, patient reverted from VT to complete degree heart block with HR 40 \MIN. Atropine 5mg was given to patient then transcutaneous pacing was applied then admitted in intensive care unit and transvenous pacing was done successfully. ECHO study showed EF 25% and dilated cardiomyopathy. After a-20-day from discharge and following up with cardiologist, that patient was brought with cardiac arrest (a systole) in emergency department. CPR was done successfully and restrained spontaneous circulation with complete heart block. After admission in CCU by 50 min, patient developed pulseless VT, successfully resuscitated with defibrillation .Blood test including electrolytes were normal. Then, another episode of VT developed after one hour, and it was followed by repeated episodes of VT. He was diagnosed as having electrical storm. Initial rapid administration of 125mg amiodarone (antiarrhythmic) and propranolol (beta blocker) were started after the second episode and an additional dose of amiodarone as loading dose after cardiology consultation. No more episodes of electrical storm were detected after that .Then the patient transferred to high center for electrical ablation and an implantable cardioverter-defibrillator implantation.

Discussion and conclusion:**DEFENATION:**

Here we report a case of drug-refractory electrical storm that occurred in our hospital. The electrical storm continued despite using antiarrhythmic drugs and beta blocker. Electrical storm is an increasingly common and life-threatening syndrome that is defined by 3 or more sustained episodes of ventricular tachycardia, ventricular fibrillation appropriate shocks from an implantable cardioverter-defibrillator within 24 hours (1). Sustained VT lasts 30 seconds, involves hemodynamic compromise or require intervention to terminate the episode (1).

. INCIDENCE:

The condition occurs in 10% to 20% of ICD (2). Patients who are experiencing acute myocardial infarction or have had an myocardial infarction or those who have an inherited arrhythmic syndrome are also susceptible (3). In the MADIT-2 sub study, the patients with electrical storm had a 7.4-fold higher risk of death than patients without electrical storm (4). The studies showed that the risk of death from electrical storm was highest within the first 3 months after a storm (6, 7). Recurrent VT and ICD shocks may cause left ventricular systolic dysfunction and myocardial injury (8,9), which can lead to adrenergic neurohormonal activation and exacerbate heart failure (10,9).

Initial evaluation of ES:

It is strongly emphasized that an ambiguous wide complex tachycardia should be presumed to be VT, especially in patient has structural heart disease. If this rule is followed, the diagnosis of electrical storm will be accurate in 80% of all patients with tachycardia and in 95% who have previous MI (11). Furthermore, treating VT as though it were SVT by using calcium channel blocker can participate cardiac arrest, whereas SVT might resolve with treatment aimed at VT. ES can be classified on the basis of 3 gross ECG surface morphologies: monomorphic VT, polymorphic VT or VF. In most cases presents as sustained monomorphic VT. Most of monomorphic VT due to electrical wave front reentry around a fixed anatomic barrier, most commonly scar tissue after MI (13). Polymorphic VT means beat to beat variation in QRS complexes, due to multiple wave fronts must propagate throughout the heart or appear in many parts of heart (12). ES is often the initial manifestation of ischemia. In contrast, monomorphic VT is unusual during the first 72 hours of infarction. The specific arrhythmia that arises from acute myocardial infarction is almost always polymorphic VT (14). Ischemia leads Purkinji cell automaticity, and spontaneous firing of these fibers triggers polymorphic VT or VF.

Pharmacological therapy for ES:**Adrenergic Blockade**

ES activates sympathetic nervous system which leads to increase level of catecholamines. The catecholamines are proarrhythmic and may lead to ventricular arrhythmias (36). B-blockers play role in management of ES. Propranolol decreases incidences of fatal VF during MI and sudden cardiac arrest after MI (38). The lipophilic nature of propranolol enables active penetration of central nervous system and the blockade of central and prejunctional receptors in addition to peripheral B-receptors (16-17). Propranolol may effectively suppress ES if we compare it with effect of others B-Blocker (15).

Amiodarone

It is widely used in treatment ES (1). It leads to block fast sodium channels, inhibits norepinephrine release, block L-TYPE calcium channel.

Nonpharmacological Therapy

Radiofrequency ablation is indicated for treatment drug-refractory ES (1).

Conclusion

Electrical storm, life-threatening emergency, is characterized by 3 or more sustained VT or VF episodes or appropriate ICD shocks within 24 hours. Patients with an electrical storm typically have a poor outcome. Initial management involves identifying and correcting the underlying ischemia, electrolyte imbalances, or other inciting factors. Amiodarone and β -blockers, especially propranolol, form the cornerstone of antiarrhythmic therapy in most patients. Nonpharmacologic treatment, including Radiofrequency ablation.

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