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Refractory ventricular tachycardia due to anti-malarial drug overdose

Aman Sharma[1]*; Atanu Bhattacharya[1]; Rajib Lochan Bhanja[2]

***Aman Sharma**

Department of Emergency Medicine, Apollo Hospitals, Bilaspur, CG, India

Phone: +91-975-2711-999; Email: amansharma.dr@gmail.com

Abstract

The anti-malarial drugs are life saving drugs & widely used used for treating in African, Southeast Asian & Latin American countries [1]. We report a case of a 23 year old female patient with history of ingestion of 15 tablets of Chloroquine, who was referred to our Emergency Department (ED) with complaints of fever, shortness of breath & palpitations. We report the management of electrical storm associated with chloroquine toxicity.

Keywords

refractory VT; electrical storm; drug induced arrhythmia; long QT syndrome

Introduction

The cardio toxicity of anti-malarial medicines has received renewed interest in recent years as there were cases reported regarding the complications associated with these drugs. Drug-induced QT/QTc interval prolongation serves as a indicator for risk of drug-induced torsade de pointes (TdP). Risk factors for drug-induced QT/QTc prolongation include female gender, structural heart disease, genetic defects of cardiac ion channels, electrolyte disturbances, bradycardia, hepatic impairment, and concomitant use of medications that prolong the QT/QTc interval or increase drug levels. The burden of Malaria in the developing nations leads to free availability of these drugs & they have been frequently used as a chemical agent for suicidal attempts. Electrical storm is characterized by 3 or more sustained VT or VF episodes in 24 hours.

Case Report

A 23 year old female patient was brought to the emergency room (ER) with alleged history of ingestion of 15 tablets of Chloroquine. She had ingested these tablets 2 days ago & was asymptomatic for the initial 48 hours. She was brought after she developed breathing difficulty, palpitations & fever. Upon her arrival to the ER she was found to be in shock, her blood pressures were not recordable, peripheral pulsa-

tions were feeble with prolonged capillary refilling time, hypoxia with increased respiratory efforts. She was immediately taken to Traige-2 due to her compromised state. Her electrocardiogram showed broad QRS complex tachycardia with QTc prolongation of 552 milli seconds (Figure 1).

She was treated as per advanced cardiac life support guidelines & given cardioversion under sedation with 100 Joules twice but arrhythmia was not reverted back to normal sinus rhythm. Despite subsequent synchronized cardio versions her heart rate did not come down. Meanwhile blood samples were reported, the electrolytes were within normal range as well. Further she was initiated on anti arrhythmic agents. Injection Amiodarone 150 milligrams followed by intravenous infusion along with Noradrenaline infusion as the patient was in shock , Dopamine was not administered due to its arrhythmogenic effects. Since the electrical storm did not respond to cardio version & amiodarone, IV infusion of Lidocaine 2% was started, Injection Magnesium Sulphate was also administered & heart rate was lowered down eventually, the electrocardiogram showed reduced QTc of 5l2 milliseconds (Figure 2).

Upon further evaluation she was found to have severe Left Ventricular dysfunction (Ejection Fraction -20%) with elevated Troponin-I level of 2.02 ng/ml, pro-BNP was over 35,000 pg/mL suggestive of Myocarditis. Transferred to cardiac critical care unit where she was continued on anti arrhythmic agents & noradrenaline for next 24 hours. Though the QTc interval decreased she still had intermittent tachyarrhythmia which resolved spontaneously, she required vasopressor support for another 4 days before they were tapered off. Our patient recovered well & was dischared after 8 days of hospital stay.

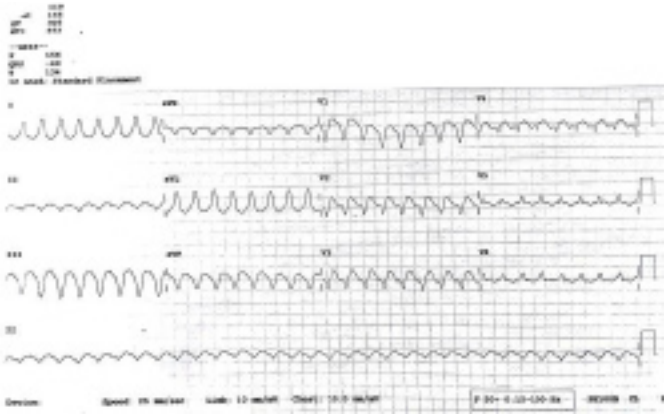

Figure 1: ECG showing broad complex regular tachycardia with QTc of 552 milliseconds.

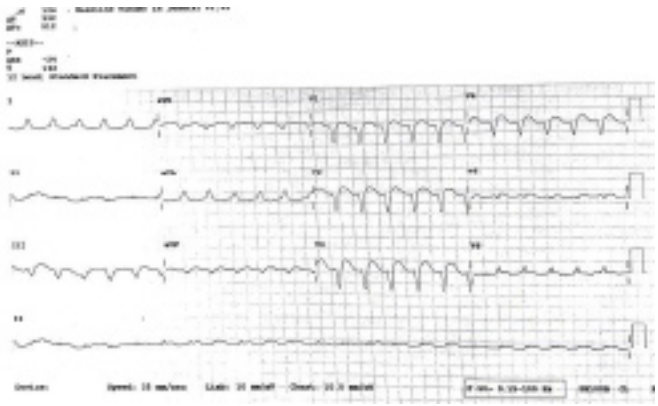

Figure 2: ECG showing decreased heart rate after multiple attempts of cardioversion & anti arrhythmic drug administration.

Discussion

Chloroquine due to its rapid gastro-intestinal absorption if ingested over its normal dose (> 2.5 gram) possesses life threatening risk & may cause cardiac arrhythmia and cardiac arrest. The quinidine like membrane stabilizing effects of chloroquine and negative inotropic action make it cardio toxic if ingested in larger amount [2].

Chloroquine inhibits spontaneous diastolic depolarization, slows conduction, lengthens the effective refractory period and raises the electrical threshold (Jaegeretal., 1987) resulting in decreased excitability and contractility, impairment of conductivity, leading to arrhythmia, a systole and death [3]. It may also cause apnoea & patients may require mechanical ventilation [4].

Treating refractory arrhythmia is a challenging task for any emergency physician but following the Advanced cardiac life support [5] protocols improves the outcome. This patient presented late to the hospital almost after 48 hours after the ingestion of drug, she had taken around 15 tablets of chloroquine 500mg strength. As per Jaeger et al.- 20 mg/Kg is a toxic dose, 30 mg/Kg may be lethal and 40 mg/Kg is usually lethal without early intensive therapy. This patient weighed around 50 kgs & had taken around 7.5 grams of chroloquine, which was a lethal overdose.

Here clinical presentation of shock & refractory cardiac arrhythmia was a challenging task to treat. Though the cause for developing myocarditis was unclear in her case. The injury to myocardium may also have precipitated the cardio toxicity of choloroquine though there is very little evidence to support this hypothesis. Further evaluation for myocarditis include cardiac MRI & histopathological evaluation however these were not performed on our patient as she was hemodynamically unstable & could not be taken for a MRI & relatives did not consent for biopsy of cardiac muscle. Beta blockers play a key role in management of electrical storm, however single drug therapy is not effective in this clinical condition & combination of anti arrhythmic agents is recommended in the treatment. This patient recovered well & was discharged after 8 days of hospitalization. Her discharge medications included Clopidogrel, Metoprolol, Amiodarone & Spironolactone. On subsequent follow-up patient's ejection fraction increased to about 30-40%.

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Authors Information: Aman Sharma[1]*; Atanu Bhattacharya[1]; Rajib Lochan Bhanja[2]
[1]Department of Emergency Medicine, Apollo Hospitals, Bilaspur, Chhattisgarh, India
[2]Department of Cardiology, Apollo Hospitals, Bilaspur, Chhattisgarh, India

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