Magnesium-Responsive Polymorphic Ventricular Tachycardia Associated with Alcoholic Binge Drinking

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We recently treated a patient with repetitive episodes of polymorphic ventricular tachycardia (VT) and a prolonged QT interval following alcoholic binge drinking. The VT episodes subsided after empiric administration of intravenous magnesium. The following case history illustrates the role of alcohol as a possible etiology in patients with arrhythmia. Treatment of this unusual arrhythmia and review of the literature provide insight into the growing problem of alcohol binging.

PATIENT DESCRIPTION

A 47 year old female presented to the emergency department (ED) with recurrent syncope and vomiting. Her past medical history included untreated hypertension, smoking and alcohol abuse. On physical examination she appeared anxious and diaphoretic. Her systemic blood pressure was 100/60 mmHg with an average heart rate of 90. An electrocardiogram demonstrated sinus rhythm interrupted by episodes of polymorphic non-sustained VT [Figure 1A]. During sinus rhythm, the QT interval was markedly prolonged [Figure 1B]. Transthoracic echocardiogram revealed normal ventricular function. Due to hypotension and persistent ventricular arrhythmia, coronary angiography was performed which demonstrated normal coronary arteries.

In the ED the patient received intravenous amiodarone and metoprolol which did not affect the VT episodes. The combination of prolonged QT and polymorphic VT also prompted administration of intravenous magnesium while laboratory results were still pending. The patient's initial lab values included a sodium level of 132 mEq/L, potassium 2.9 mEq/L, magnesium 1.2 mg/dl, calcium 8.8 mg/dl, phosphate 1.9 mg/dl, total bilirubin 4.5 mg/dl, aspartate aminotransferase (AST) 245 IU/L, alanine aminotransferase (ALT) 90 IU/L and gamma-glutamyl transferase (GGT) 1578 IU/L.

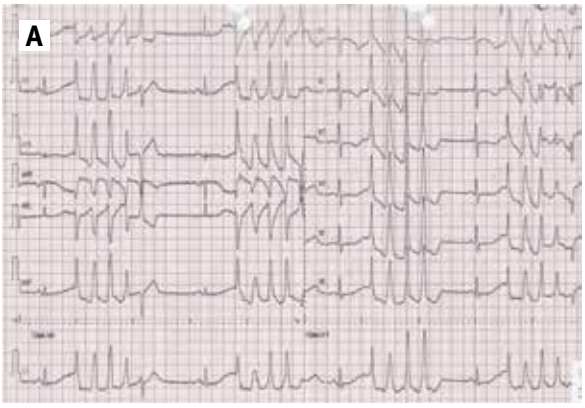
The patient was questioned about alcohol ingestion due to the combination of severe electrolyte depletion and abnormal liver function tests. The patient scored 1/4 on the CAGE questionnaire and added that she drank five glasses of vodka on the night prior to admission.

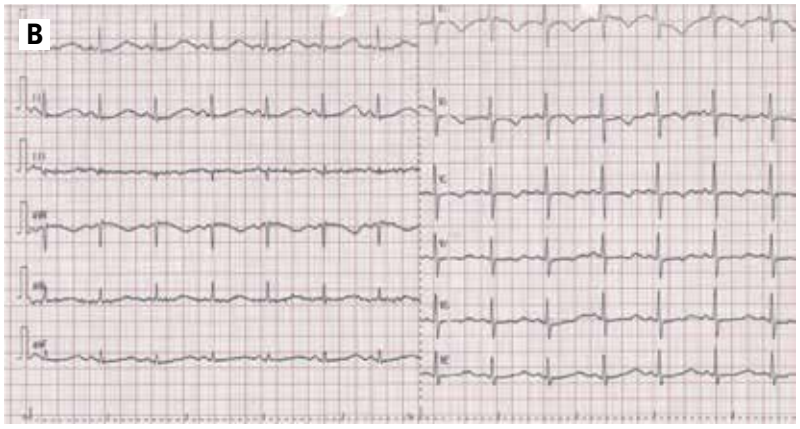
The episodes of polymorphic VT did not recur and subsided after the initial magnesium infusion. The QT interval was significantly shortened after electrolyte repletion [Figure 1C]. The patient was discharged with the recommendation to avoid excessive drinking and was referred to social services for further treatment of her alcoholism.

COMMENT

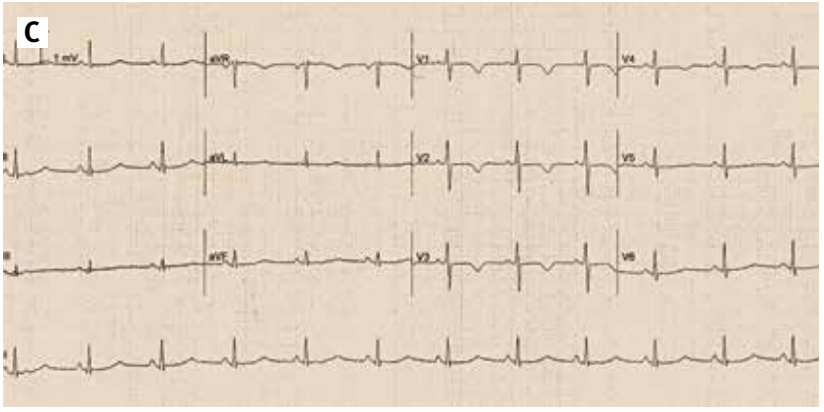
Alcoholic binge drinking is commonly known as a precipitant of atrial fibrillation and supraventricular arrhythmia, the "holi-

Figure 1. 12 lead ECG [A] Sinus rhythm interrupted by episodes of polymorphic non-sustained VT **[B]** In sinus rhythm, with a severe prolongation of the QT interval





[C] After correction of electrolytes, with a significant shortening of QT interval



day heart syndrome" (HHS) [1]. This term was first used in 1978 in a study that reviewed patients with arrhythmias following heavy alcohol ingestion [2]. Although the most common arrhythmias were supraventricular, ventricular arrhythmias occurred as well. Later on, additional cases of VT and sudden death associated with alcohol consumption were described [3]. The mechanisms of arrhythmia include conduction disturbance, increased sympathetic activity and metabolite toxic effects [1]. Perhaps the mechanism in some cases may be the electrolyte abnormality and not necessarily a direct effect of alcohol on the heart.

With growing alcohol consumption among Israeli youth, awareness of alcohol as a potential cause of cardiovascular collapse in general and more specifically of arrhythmias, as demonstrated in the present case, should be increased.

The combination of abnormal liver function tests with severe electrolyte depletion should raise the possibility of alcoholism. In fact, the two most common causes of severe hypomagnesemic hypokalemia were alcoholism and cisplatin administration in one report [4]. The use of alcohol and possibly chronic alcoholism was supported in our patient by her jaundice and laboratory values of cholestasis and hepatitis. The presence of hypokalemia in this patient could be explained by diuresis induced by alcohol and no intake of food or other potassium-rich substitutes.

Lastly, repetitive episodes of polymorphic VT and prolonged QT should be treated with intravenous magnesium, as described by Tzivoni et al. [5]. This treatment should be given even if blood chemistry results are still pending.

In summary, alcoholic binge drinking may induce ventricular tachycardia as part of the "holiday heart syndrome." A combination of hepatic impairment and electrolyte depletion should raise the suspicion of alcohol abuse. The associated VT should be treated with IV magnesium.

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