HOLIDAY HEART SYNDROME

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ABSTRACT

Holiday heart syndrome is an acute cardiac rhythm or conduction disturbance associated with heavy ethanol consumption in a person without other clinical evidence of heart disease. Typically, this resolves rapidly with spontaneous recovery during subsequent abstinence from alcohol use. Two adolescents were presented with different degrees of heart block following acute alcohol ingestion. The electrocardiograph abnormalities resolved within 12 hours. Further investigations, including echocardiography and 24 hour electrocardiograph were normal. Emergency Department physicians should be aware of the possibility of acute alcohol ingestion causing changes in cardiac conduction which has a potential to develop into life threatening arrhythmias, thus, can occur in children and young adolescents.

Keywords: Holiday heart syndrome, Alcohol, Heart block, Arrhythmia

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INTRODUCTION

Holiday heart syndrome is defined as an acute cardiac rhythm disturbance and/or conduction disturbance associated with heavy ethanol consumption in a person without other clinical evidence of heart disease\(^1,2\). Typically this resolves rapidly with spontaneous recovery during subsequent abstinence from alcohol use and specific antiarrhythmic therapy is usually not indicated\(^3\). The most common rhythm disorder is atrial fibrillation, which usually converts to normal sinus rhythm within 24 hours, but other rhythm disturbance can occur\(^1,2\).

Several mechanisms have been suggested to explain the cause of alcohol induced arrhythmia in Holiday heart syndrome. It was considered that ethanol can have direct or indirect effects on the excitability of the heart. Direct effect of alcohol can be via an increased secretion of epinephrine and norepinephrine, as increased level plasma free fatty acids, decreased sodium current and a change on intracellular pH, which could be acidosis with low doses, or alkalosis with higher doses of alcohol, respectively. Indirect mechanism may be due to the effect of acetaldehyde, the primary metabolite of alcohol, or fatty acid ethyl esters\(^4\). Holiday heart syndrome has been described mainly in adults, thus, this manuscript will induce awareness and draw the attention to the reader that this syndrome can occur in children and young adolescents.

CASES

CASE 1

A 14 year old boy was admitted with acute alcohol ingestion. Bradycardia (heart rate 53 per min) was noted on admission. He required a fluid bolus in view of hypotension following which his blood pressure remained stable. The electrocardiograph (ECG) revealed a second degree heart block, which is known as Mobitz type 1 with a Wenckebach phenomenon (Fig. 1). Urine toxicology did not show the presence of any drugs apart from alcohol. A repeated ECG 24 hrs later was normal. Subsequent 24 hrs ambulatory ECG and an echocardiography were also normal. There was no family history of cardiomyopathy or sudden death.

CASE 2

A 15 year old girl was admitted with acute alcohol ingestion. Cardiorespiratory observations were within normal limits apart from a slow heart rate (60 per min). The ECG revealed a 1st degree heart block (Fig. 2). Her serum alcohol level at presentation was 90 mg/dL. A drug screen was negative. A repeated ECG after 24 hrs was normal. Subsequent 24 hrs ambulatory ECG and an echocardiography were also

Figure 1. The ECG of patient number 1, showing 2nd degree heart block (Mobitz type 1 with a Wenckebach phenomenon).

Figure 2. The ECG of patient number 2, showing 1st degree heart block.
There was no family history of cardiomyopathy or sudden death.

DISCUSSION

Recent research from United Kingdom has suggested a sharp increase in alcohol consumption, particularly among young adults. In 2007, one (20%) in five pupils said they had imbibed alcohol in the last week. The proportion of who have had alcohol in the last weeks increases with age from 3% of 11 year olds to 41% of 15 year olds[6]. Among children under 16 there were 5,280 NHS hospital admissions in 2005/06 with either a primary or secondary diagnosis of a problem specifically related to alcohol[7].

Studies show that in children, alcohol related attendances to accident and emergency department (AED) vary between 1-4.6% [8,9]. In a study by Weingberg and Wyatt, 56 (90%) children had blood alcohol level above the UK legal driving limit of 80 mg/dl[10]. Traditionally, gastrointestinal disturbances, hypothermia, dehydration, and neurological changes are typically seen after alcoholic intoxication in the pediatric population. Effects of alcohol on the heart are often underestimated. Alcohol has a direct or indirect arrhythmogenic effect on the heart leading to a decrease in the refractory period, thus potentially inducing arrhythmias[4, 11]. Although children are more susceptible to the toxic effect of ethanol, Holiday heart syndrome is usually reported mainly in adult population. The effect of alcohol on the adult ECG is reported with serum levels greater than 600 mg/dl[12]. In contrast, an alcohol level greater than 500 mg/dl is considered lethal in children[12]. In addition, the presence of Holiday heart syndrome among children and adolescent is underestimated despite the fact that a much lower level of alcohol (80-150 mg/dL) is associated with intoxication and an adverse cardiac effect in adolescents suggest that children heart is more susceptible to the arrhythmogenic effect of ethanol[12].

Acute and excessive ingestion of alcohol in a healthy study population can result in a significant increase in the PR and QTc intervals[13]. The P wave, PR, QRS and QTc intervals were all longer in patients hospitalized with acute ethanol intoxication compared to the day after intoxication[14]. The most frequent tachyarrhythmia is atrial fibrillation; less frequent, but prognostically much more significant is torsades de pointes (TdP); polymorphous ventricular tachycardia. Among bradyarrhythmias, the most significant is alcohol-induced sinus bradycardia which may be manifested by recurrent syncope[15].

CONCLUSION

Holiday heart syndrome should be particularly considered as a diagnosis in patients without structural heart disease in the setting of acute alcohol intoxication. High blood alcohol levels correlate with significant alteration in cardiac conduction with possible manifestation as arrhythmia. Its clinical course is benign and specific anti arrhythmic therapy is not indicated. Even modest alcohol intake can be identified as a trigger in some patients.

Emergency Department (ED) physicians should be aware of the possibility of acute alcohol ingestion causing changes in cardiac conduction which has a potential to develop into life threatening arrhythmias, which can occur in children and young adolescents.
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