

Bidirectional Ventricular Tachycardia Induced by Aconiti Lateralis Radix Praeparata: A Case Report

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Abstract

Herbal soups are important therapeutic agents used in Chinese medicine for various conditions. Therefore, aconitine-induced poisoning may be frequently encountered in practice among Chinese communities. However, there is limited information regarding life-threatening bidirectional ventricular tachyarrhythmia induced by aconitine intoxication and its management. We present the case of a 48-year-old woman with bidirectional ventricular tachyarrhythmia attributed to the use of processed Fuzi and describe the successful therapeutic approach adopted in this case.

Keywords: Herbal soups; Aconiti Lateralis Radix Praeparata; Bidirectional ventricular tachycardia; Aconitine

Introduction

Since more than 2,000 years, herbal soups have been widely used in Chinese medicine for the treatment of many disorders. They are mainly used for their purported health benefits and are thought to exert their beneficial effects with minimal adverse reactions. In countries such as China, South Korea, and Japan, herbal soups are used as critical emergency drugs in traditional Chinese medicine for the treatment of chronic and complicated diseases [1]. A previous study indicates that adverse effects of herbal preparations occur in 7.6% of cases and that most cases are of mild poisoning. Nevertheless, occasional cases of severe herbal poisoning, resulting in fatality, have also been reported [2]. We present a case of life-threatening polymorphic and bidirectional ventricular tachyarrhythmias with left bundle-branch block

that occurred after the ingestion of herbal decoction prepared from the root stocks of Aconiti Lateralis Radix Praeparata (Fuzi).

Case Report

The patient was a 48-year-old previously healthy female who was admitted to our institution with sudden onset of severe palpitation, tingling sensation all over the body (paraesthesia), weakness, dizziness, significant shortness of breath, chest tightness, and discomfort in the cardiac region. On admission, the patient had hypotension (blood pressure 76/46 mm Hg), was fully alert, and showed no signs of focal neurological or cerebellar disorders other than numbness in all limbs. Results of laboratory tests, including tests for liver and kidney function, electrolyte levels, and blood biochemistry, were normal. Electrocardiography revealed bidirectional ventricular tachycardia and left bundle-branch block, with a heart rate of 187 beats/min (Fig. 1).

Positive rehydration was initiated to restore the patient's blood pressure level to normalcy. However, the patient showed signs of loss of mental alertness and decrease in rate of carotid pulse to around 30 - 40/min. Therefore, the patient was administered a bolus of 1 mg epinephrine and continuous chest compressions. Lidocaine was then administered as an intravenous bolus of 100 mg, followed by continuous infusion at a rate of 2 mg/min. Ten minutes later, amiodarone (150 mg) was slowly infused for over 15 min. However, sinus rhythm could not be restored. Then, synchronized, biphasic direct current shock of 100 J was applied for cardioversion. With this, the patient regained consciousness, her blood pressure was 186/109 mm Hg, heart rate was 122 beats/min, and respiratory rate was 18 cycles/min. The electrocardiogram obtained thereafter was normal (Fig. 2).

Discussion

Herbal soups have been widely used in Chinese medicine and are popular as health tonics among Chinese communities as good alternatives to conventional medicines. However, the safety and efficacy of herbal preparations have not been adequately evaluated, partly because of a lack of a thorough understanding of pharmacology of Chinese medicines, which makes their widespread use difficult [3].

Fuzi is a well-known traditional Chinese medicinal formulation used widely since nearly 800 years. In Chinese medicine, it is used to dispel wind, remove dampness, relieve pain, and improve immunity and functioning of the nervous system.

Manuscript accepted for publication January 18, 2016

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doi: <http://dx.doi.org/10.14740/jmc2416w>

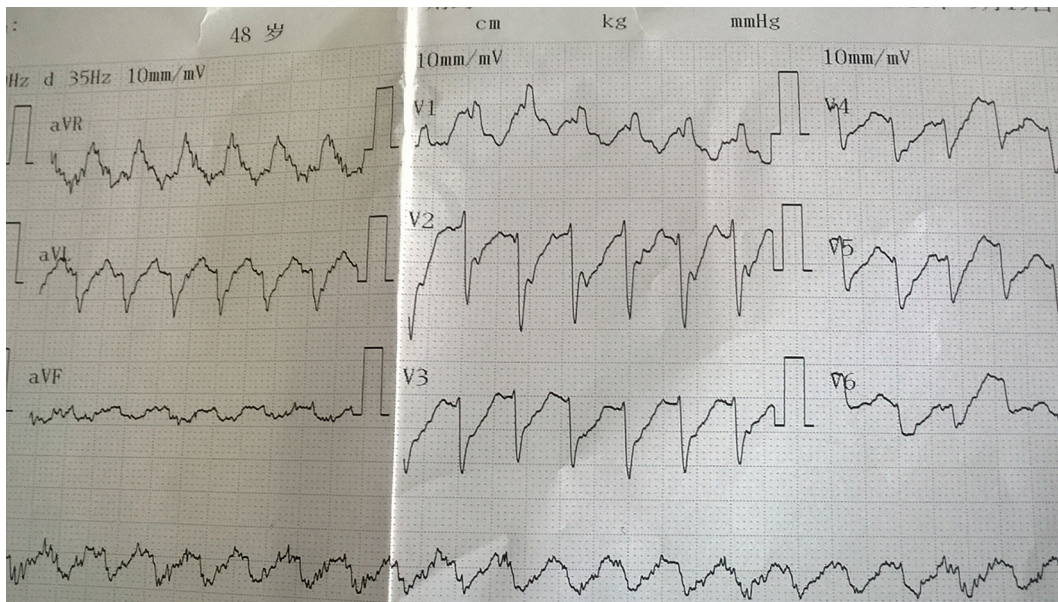


Figure 1. A 12-lead ECG revealing bidirectional ventricular tachycardia with a left bundle-branch block.

Clinically, it has been used to improve clinical microcirculation, heart failure, high blood pressure, and other diseases [4]. The main adverse effects of Fuzi are cardiotoxicity and neurotoxicity. A previous study has shown that between 2006 and 2010, 123 male and 33 female patients were treated for aconitum poisoning after consumption of herbal soups and meals, with a high proportion of patients developing stroke and fatal arrhythmia (14.3%). Aconitine, mesaconitine, and hypaconitine are the main toxic principles in Fuzi, but the concentration of toxic elements in Fuzi is very low (less than 1%). It has been reported that aconitine is toxic at a dose of 0.12 mg and above and fatal at doses of 3 - 5 mg [5].

The toxic effects of aconitine are attributed to excitation of the membrane caused by increased Na^+ inflow and subsequent inhibition by prolonged depolarization due to the increased Na^+ inflow [6]. In addition, the neurotoxic effects of aconitine include bradyarrhythmia and hypotension. Aconitine causes the release of large amounts of acetylcholine and stimulation of the vagus nerve, leading to compromised sinus node function; it may also directly inhibit the excitation of atrioventricular or ventricular ectopic pacemaker [7].

The symptoms in this case can be attributed to the consumption of a lethal dose of aconitine and the fact that patient did not cook the soup for the prescribed duration of 4 - 24 h,

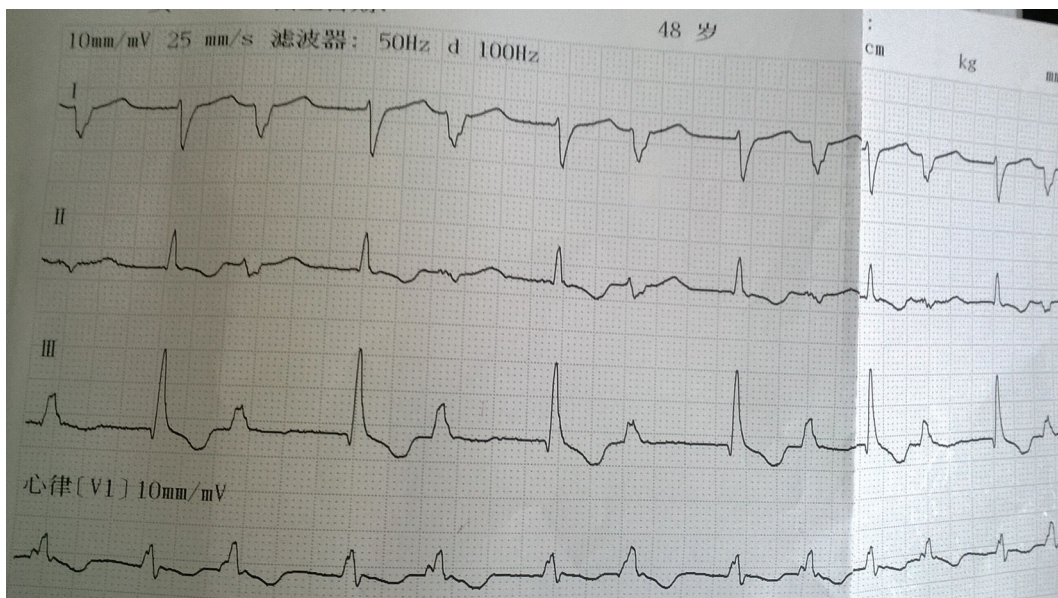


Figure 2. Complete resolution of ventricular tachycardia after biphasic direct current shock.

thereby leading to increased toxicity of aconitine.

Ventricular arrhythmia is frequently reported to be caused by aconitine, but bundle-branch block due to aconitine, as observed in this case, has rarely been reported. Since the number of cases reported is limited, the optimal treatment for life-threatening ventricular tachycardia caused by aconitine remains unclear; further, no specific antidote to aconitine has been identified. Studies have shown that amiodarone can effectively restore sinus rhythm in feline models of aconitine-induced atrial arrhythmia. Similarly, some surveys have shown that amiodarone can successfully restore sinus rhythm in cases of ventricular arrhythmias; however, the optimal dosage, method, and time of administration are unclear [8].

Thus, our case report shows that a combined treatment approach of amiodarone administration and application of synchronized, biphasic direct current shock can help manage aconitine-induced ventricular tachycardia. This may imply that combination treatment may be useful in such cases although multi-center, large-scale studies are necessary to confirm the most effective treatment protocol for aconitine-induced ventricular tachycardia.

Author Contributions

YZQ proposed the study. YZQ and HYJ collected, analyzed the data and wrote the first draft. FC and ZSJ analyzed and revised the manuscript. All authors contributed to the design and interpretation of the study and to further drafts.

Funding

None.

Competing Interest

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

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