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SPOTLIGHT

A case report of bidirectional ventricular tachycardia secondary to aconitum toxicity

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An 81-year-old male presented to the emergency department for non-vertiginous giddiness, a 2-h history of facial and hand numbness, and generalized weakness with no chest discomfort or palpitations. He had a history of hypertension, hyperlipidemia, and diabetes mellitus. He was on enalapril maleate 10 mg twice daily, atorvastatin 10 mg once daily, metformin 500 mg once daily and clopidogrel 75 mg once daily. He had no prior personal or family history of cardiac conditions and sudden death. Physical examination was normal with no neurological deficits. The patient was hypotensive despite fluid resuscitation, requiring intravenous Noradrenaline infusion of 0.2 mcg/kg/min. This was his electrocardiogram (ECG) rhythm strip on presentation (Figure 1). Blood tests did not reveal any significant cardiac enzyme or electrolyte derangements.

Figure 1 shows polymorphic ventricular tachycardia (VT), with two predominant QRS morphologies, at a rate of 150–200 bpm. The patient was treated with intravenous amiodarone. He subsequently developed runs of the following arrhythmias (Figures 2 and 3). Figure 2 shows an accelerated idioventricular rhythm with prolonged QTc of 511 ms. Figure 3 shows junctional rhythm with right bundle branch block morphology and prolonged QTc duration of 480 ms. Coronary angiography revealed minor coronary artery disease. Transthoracic echocardiography showed normal cardiac structure and function. There was a subsequent resolution of his arrhythmias with stabilization of his blood pressure after 2 days of in-hospital monitoring.

The patient subsequently revealed that he had visited a Traditional Chinese Medicine (TCM) practitioner for complaints of headache and bilateral eye pain and he presented to the hospital 1 h after ingestion of the TCM prescription. Blood and urine toxicology sent on the second day of admission came back 2 weeks later positive for aconitine at a level of <1 μg/ml. Subsequent follow-up with the patient revealed no further cardiac arrhythmias with a normal baseline ECG (Figure 4).

Bidirectional VT is a rare ventricular arrhythmia. It is associated with digoxin toxicity,[1] catecholaminergic polymorphic VT (CPVT), or Andersen-Tawil syndrome (ATS).[2] CPVT is often triggered by exercise or stress. ATS is a genetic syndrome characterized by periodic paralysis, VT, and prolonged QT interval.[2] Other rare causes of bidirectional VT can arise from the myocardial substrate.[3] This patient had no preceding illness or recent vaccinations to suggest myocarditis. Given his age, inherited conditions such as channelopathies are unlikely. He provided a history of TCM use, which was a handwritten prescription containing 25 different herbs including aconite root. Other ingredients included Rhizome Gastrodia, Salvia Miltiorrhiza, Concha Haliotidis, ginseng root, and cassia seed, which are not known to cause cardiotoxicity to our knowledge. Further questioning revealed inadequate preparation of the TCM—the prescription stated to boil the TCM for at least 2 h but it was boiled for less than an hour.

Aconite, also known as wolfsbane, has been used for centuries in TCM for anti-inflammation and analgesic properties. However, in its raw form, aconite is highly poisonous and lethal toxicity can occur with doses as low as 2 mg.[4] As such, it must be prepared carefully. Processed aconite roots must first be washed and soaked in water, followed by adequate boiling to reduce the toxic alkaloid content and produce a less toxic form of aconite alkaloid.[5] With regard to our patient, it is unclear the exact amount of aconitum he ingested, but it is possible that the inadequate preparation of the TCM resulted in toxicity. Aconite binds to voltage-sensitive sodium channels in excitable tissues such as myocardium, nerves, and muscles, resulting in sustained tissue depolarization.[4] As such, it results in QT prolongation and also facilitates the development of triggered activity from

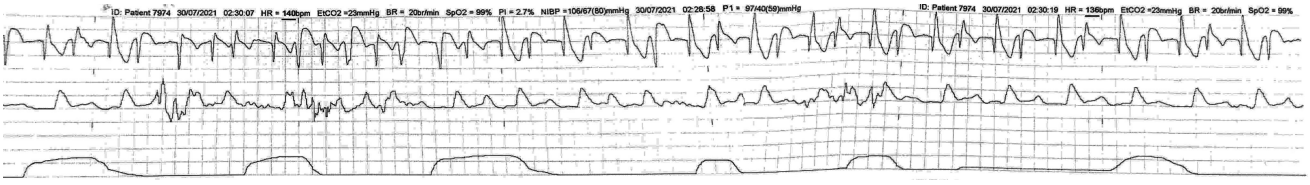

FIGURE 1 Bidirectional ventricular tachycardia

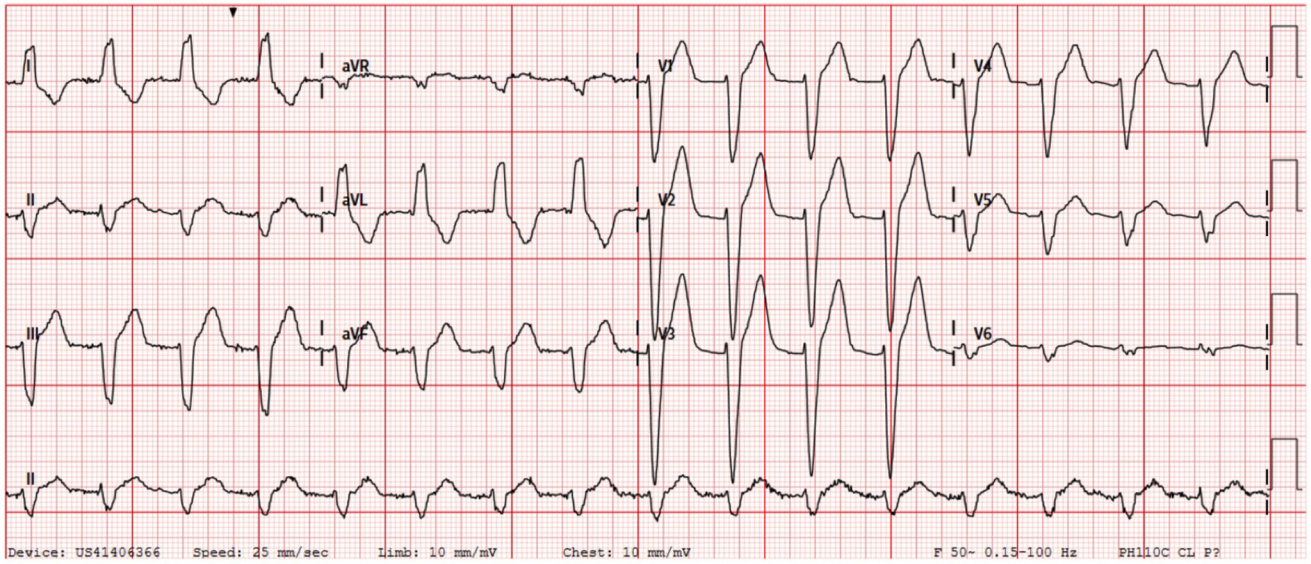

FIGURE 2 Accelerated idioventricular rhythm with prolonged QTc

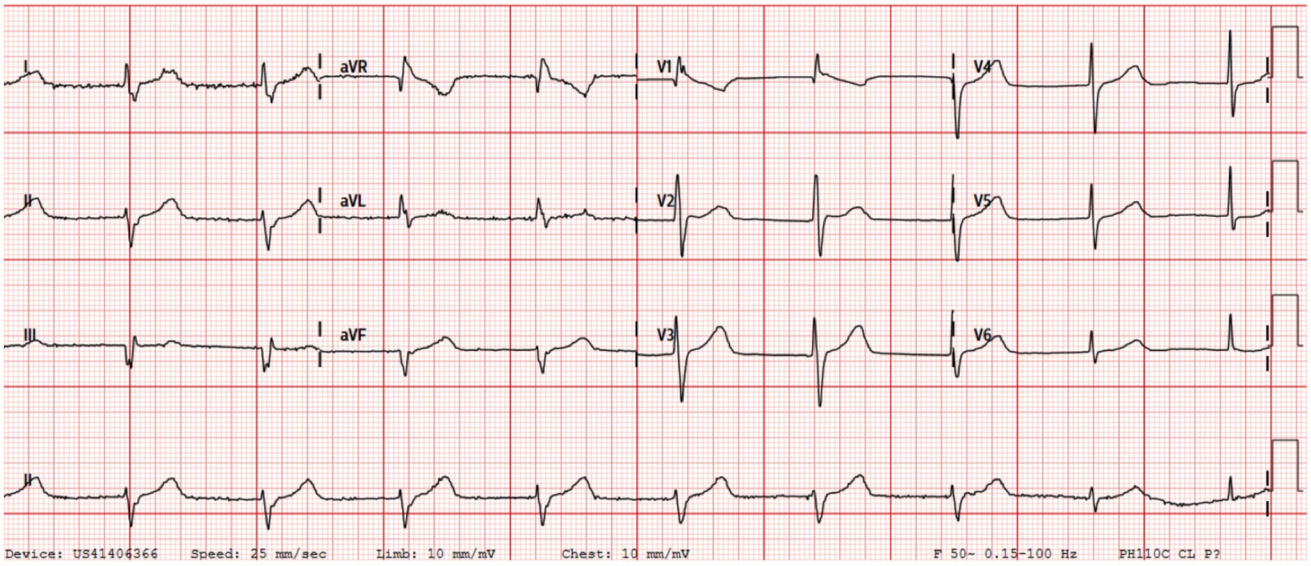

FIGURE 3 Junctional rhythm with RBBB pattern and prolonged QTc. RBBB, right bundle branch block

early after-depolarization. Aconite poisoning can cause a spectrum of arrhythmias, ranging from malignant ventricular arrhythmias such as VT, torsade de pointes, ventricular fibrillation, to bradyarrhythmias such as junctional rhythm, fascicular and bundle branch blocks, or repolarization abnormalities with QT prolongation. Our patient exhibited both tachy and brady arrhythmias with prolonged QTc, which are characteristic ECG changes of aconitum toxicity. Mortality rates of cardiotoxicity from aconite poisoning have been reported to be as high as 12%.[4] In cases of refractory ventricular arrhythmias or profound cardiogenic shock, advanced mechanical circulatory

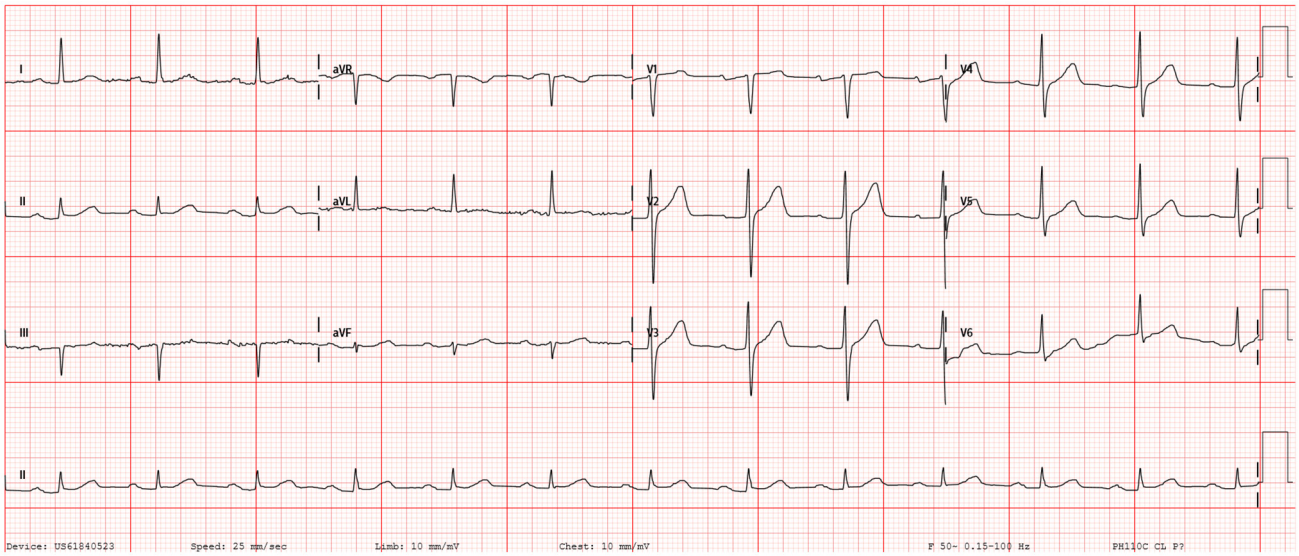

FIGURE 4 Baseline ECG showing normal sinus rhythm. ECG, electrocardiogram

support may be required. At present, there is no antidote for aconite toxicity and treatment is supportive.[4]

We present a case of bidirectional VT secondary to unintentional aconite poisoning. Healthcare workers need to be vigilant regarding cases of aconitum toxicity, especially in atypical presentations. There is also a need to educate the public regarding the consumption and preparation of potent TCM herbs that may result in lethal toxicity.

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CONFLICT OF INTEREST

There is no conflicts of interest for any of the authors.

DECLARATIONS

Approval of the research protocol: No human participant was involved in this study. *Informed consent*: N/A. *Registry and the Registration No. of the study*: N/A. *Animal Studies*: N/A.

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