GAVIN PUBLISHERS

OPEN ACCESS

Annals of Case Reports

Johnson M. Ann Case Report 14: 413.

DOI: 10.29011/2574-7754.100413

Case Report

ECLS and Lipid Resuscitation in Severe Taxus Poisoning: A Case Series

J. Swinnen, M. Vanneste, M. Veys, P. Dewolf and M. Sabbe*

Department of Emergency Medicine, University Hospital of Leuven, Leuven, Belgium

***Corresponding author:** Marc Sabbe, Department of Emergency Medicine, University Hospital of Leuven, Herestraat 49, 3000 Leuven, Belgium

Citation: Swinnen J, Vanneste M, Veys M, Dewolf P, Sabbe M. ECLS and Lipid Resuscitation in Severe Taxus Poisoning: A Case Series. Ann Case Report 14: 413. DOI: 10.29011/2574-7754.100413

Received Date: 05 June, 2020; **Accepted Date:** 17 June, 2020; **Published Date:** 24 June, 2020

Abstract

Context: Different cases of accidental and intentional poisoning with Taxus baccata have already been described. Standard therapy, nor antidotes exists. Previously, supportive therapy, digoxin-specific antibody (Fab) fragments and use of ECLS were reported with varying results.

Case details: In this case series we describe two cases in which cardiac arrest occurred after suicidal ingestion of Taxus baccata. In the first case, supportive therapy was combined with ECLS resulting in neurological and cardiac recovery. In the second case, supportive therapy, lipid therapy and ECLS also resulted in a good outcome.

Discussion: Based on this experience and previously reported cases, we suggest a new strategy combining supportive therapy with lipid resuscitation as "bridge to" ECLS and recovery.

Keywords: Taxus; Yew; ECLS; ECMO; Lipid resuscitation; Poisoning; Intoxication, Case report

Introduction

We present two cases of a near-fatal suicidal ingestion of Taxus baccata. Taxus baccata, or European yew, is an evergreen shrub or tree used for ornamental landscaping or pharmaceutical purposes [1]. Different case studies of accidental and intentional poisoning have already been reported [2-9]. In our cases, we want to advocate to combine supportive therapy, lipid therapy and extracorporeal life support (ECLS).

Cases

In the first case, a 24-year-old student chemistry was admitted without a clear history of poisoning. Initially, he was admitted following a short loss of consciousness but in hemodynamically stable condition. Once in hospital, a broad QRS pulseless electronical activity (PEA) occurred, leading to a collapse, and refractory to transcutaneous pacing. Veno-arterial ECMO was established during advanced life support (ALS). A diminished cardiac function was demonstrated on transthoracic echocardiography (TTE). There were no laboratory abnormalities. Toxicological investigations demonstrated large amounts of Taxus baccata. ECLS was continued for a total of 36 hours. His neurological state, cardiac function and ECG fully recovered. He was discharged after 9 days.

In the second case, a 25-year-old woman was admitted one hour after ingestion of a self-made tea and some Taxus baccata leaves. The tea, made of Taxus baccata, contained at least 1.3 grams of leaves per kilogram of body weight. Initially she was hemodynamically stable, but during examination, a Torsade de Pointes occurred, leading to asystole following initial magnesium therapy. After a few minutes of asystole, a short episode of pulseless ventricular tachycardia occurred. Asystole persisted for 12 minutes after a DC shock. Due to the suspected lipophilic characteristics of the alkaloid taxine B, and the potential co-ingestion of other cardiotoxic agents, a trial of lipid emulsion therapy was given during ALS. Return of spontaneous circulation was achieved shortly after administration. Due to refractory bradycardia and low cardiac output failure, veno-arterial ECMO was established and was continued for 24 hours. TTE estimation of the left ventricular ejection fraction was approximately 15% after resuscitation and was fully normalized at time of discharge, six days after admittance.

Discussion

Most intentional poisonings result in a presentation of the typical symptoms, while there are often none, however,

following an accidental ingestion [6]. Symptoms are divided into cardiogenic (heart failure, brady- and tachyarrhythmia, cardiac arrest), gastrointestinal (nausea, vomiting, abdominal pain) and neurological (dizziness and seizures) symptoms [1].

These symptoms are caused by several toxins: taxine alkaloids (taxine B, paclitaxel, isotaxine B, taxine A), glycosides (taxicatine) and taxane derivates (taxol A, taxol B) [10]. Taxine B is known to be most toxic, especially to the heart. Taxine alkaloids interfere with calcium and sodium transport in myocardial cells, which causes an increase of the AV conduction time and QRS duration. These changes lead to a decrease in heart rate, a second or third-degree AV conduction block and complete diastolic cardiac arrest. Additionally, taxine B reduces the maximum rate of depolarisation of the action potential in isolated papillary muscle and resembles class I antiarrhythmic drugs [1].

There is no standard strategy for the treatment and is mainly based on case reports and experience. As a result, there is little to no proper scientific support. Our cases suggest a combination of supportive therapy with early consideration of lipid resuscitation and starting up veno-arterial extracorporeal membrane oxygenation (VA ECMO).

As there are no known antidotes for taxus, we need to focus first and foremost on maximally supportive and symptomatic therapy. However, taxus-induced dysrhythmias are often refractory or only temporarily responsive to atropine, catecholamine, amiodarone, transcutaneous/intravenous pacing or electrical cardioversion [6,9]. The same applies to the use of lidocaine [8] and magnesium sulphate. Some authors report the use of sodium bicarbonate by analogy with other wide QRS intoxications as a result of interaction with sodium channels. Sodium bicarbonate is administered to increase pH, reverse acidosis and increase sodium transport over the myocardium. Varying and/or temporarily positive effects are reported [6,7]. No significant effect was observed in a pig model after administering sodium bicarbonate to pigs poisoned witch taxus [11].

In an early stage and to reduce absorption, activated charcoal and gastric emptying is worth considering.

Haemodialysis is useless given that taxus toxins have a high molecular weight and a high volume of distribution, and are relative insoluble in water. Dialysis could, however, support efforts to correct an unfavourable metabolic condition [3,9].

Repeatedly administering digoxin-specific antibody (Fab) fragments appears to be more effective in case of severe taxus poisoning [7]. Several case reports mention a positive effect in a resuscitation setting whereby ROSC is (temporarily) obtained several times. Taxine alkaloids might be structurally similar to digitalis, thus binding to the antibodies as well. This theory is supported by a paradoxical increase of the digitalis/taxine levels after the administration of antibodies, which may indicate a redistribution from the tissues to an antibody-bound condition [2].

ECLS has already proven its value for the treatment of intoxicated patients in carefully selected groups [12]. A positive cardiac and neurological outcome has also been reported following ECMO therapy in case of a severe taxus poisoning. Given the relatively long half-life of the toxins and the reversibility of the cardiotoxicity, ECLS seems to be a suitable 'bridge to recovery' [2-6]. In our two cases, a positive outcome was also obtained.

Our second case is the first reported case whereby lipid resuscitation and VA ECMO were combined. Lipid therapy was considered, given the known lipophilic characteristics of the cardiotoxic toxins of taxus [9]. Intralipid has been described only once before in a severe taxus poisioning with temporarily obtained ROSC [8]. It was followed by a deterioration of the patient's condition whereby ECMO was averted by means of drug treatment. In our case, intralipid was used as a 'bridge to ECMO', temporarily stabilising the heart and thus buying valuable time to start VA ECMO under more favourable circumstances.

On the basis of the case reports described here, we suggest the following overview in table 1 that may serve as the basis for a treatment strategy.

Symptoms	Strategy
None	Watch and observe
Mild	Supportive care
(Gastro-intestinal)	Close observation
	Consider activated charcoal
Mild	Supportive care
(Convulsions)	Benzodiazepines
	Consider activated charcoal
Status epilepticus	Consider lipid therapy
Severe	Maximal supportive therapy
(Cardiogenic shock, Dysrhythmias, Cardiac arrest)	Consider activated charcoal and gastric emptying
	Consider Fab
	Consider lipid therapy
	Consider VA ECMO

Table 1: Suggested therapy following Taxus poisoning.

Conclusion

On the basis of our case series, we suggest a combination of lipid resuscitation and ECMO as a new strategy for severe taxus poisoning as "bridge to" ECMO and recovery.

Acknowledgements

Special thanks to Katrien Bollen, who has carefully and critically looked at the English language in this article.

Declaration of Interest Statement: The authors report no conflict of interest.

References

1. Wilson CR, Sauer J, Hooser SB (2001) Taxines: a review of the mechanism and toxicity of yew (Taxus spp.) alkaloids. Toxicon 39: 175-185.
2. Farag M, Badowski D, Koschny R, Skopp G, Brcic A, et al. (2017) Extracorporeal life support and digoxin-specific Fab fragments for successful management of Taxus baccata intoxication with low output and ventricular arrhythmia. Am J Emerg Med 35: 1987.
3. Vardon Bounes F, Tardif E, Ruiz S, Gallart J, Conil J, et al. (2017) Suicide attempt with self-made Taxus baccata leaf capsules: survival following the application of extracorporeal membrane oxygenation for ventricular arrythmia and refractory cardiogenic shock. Clin Toxicol (Phila) 55: 925-928.
4. Baum C, Bohnen S, Sill B, Philipp S, Damerow H, et al. (2015) Prolonged resuscitation and cardiogenic shock after intoxication with European yew (Taxus baccata): Complete recovery after intermittent mechanical circulatory support. Int J Cardiol 181: 176-178.
5. Thooft A, Goubella A, Fagnoul D, Taccone FS, Brimioulle S, et al. (2014) Combination of veno-arterial extracorporeal membrane oxygenation and hypothermia for out-of-hospital cardiac arrest due to Taxus intoxication. CJEM 16: 504-507.
6. Panzeri C, Bacis G, Ferri F, Rinaldi G, Persico A, et al. (2010) Extracorporeal life support in a severe Taxus baccata poisoning. Clin Toxicol (Phila) 48: 463-465.
7. Pierog J, Kane B, Kane K, Donowan JW (2009) Management of isolated yew berry toxicity with sodium bicarbonate: a case report in treatment efficacy. J Med Toxicol 5: 84-89.
8. Zutter A, Hauri K, Evers KS, Uhde S, Fassl J, et al. (2017) Chaotic Arrhythmia During Successful Resuscitation After Ingestion of Yew (Taxus baccata) Needles. Pediatr Emerg Care 35: 223-235.
9. Dahlqvist M, Venzin R, Konig S, Faber K, Weinmann W, et al. (2012) Haemodialysis in Taxus baccata poisoning: a case report. QJM 105: 359-361.
10. Kobusiak-Prokopowicz M, Marciniak A, Ślusarczyk S, Sciborsky K, Stacuhrska A, et al. (2016) A suicide attempt by intoxication with Taxus baccata leaves and ultra-fast liquid chromatography-electrospray ionization-tandem mass spectrometry, analysis of patient serum and different plant samples: case report. BMC Pharmacol Toxicol 17: 41.
11. Ruha AM, Tanen DA, Graeme KA, Curry SC, Miller MB, et al. (2002) Hypertonic sodium bicarbonate for Taxus media-induced cardiac toxicity in swine. Acad Emerg Med 9: 179-185.
12. de Lange DW, Sikma MA, Meulenbelt J (2013) Extracorporeal membrane oxygenation in the treatment of poisoned patients. Clin Toxicol (Phila). Jun 51: 385-393.