Successful organ transplantation after fatal yew ingestion

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Objective

Giving advice on the use of organs for transplantation after brain death of intoxicated patients is not a very common request brought forward to poison centres, and data is often limited. Blood screening for toxic substances is very important for a reliable diagnosis of brain death and organ donation.

We report on a case of fatal *Taxus baccata* (European yew) poisoning where blood levels were acquired to provide additional data for determining brain death and a successful post-mortem kidney donation .

Figure 1: *Taxus baccata.*

Case Report

A middle-aged woman of slight statue and a bodyweight of 55 kilograms ingested 50 shredded yew leaves in a suicide attempt. Gastroscopy upon arrival could not retrieve any significant plant material, and the patient had already developed wide complex ventricular tachycardia. Despite extensive therapeutic measures, she deteriorated rapidly.

Within six hours, cardiogenic shock occurred. Cardiopulmonary reanimation as well as attempts to treat arrhythmias with digitalis antidote and lidocaine proved unsuccessful. Ultimately, venous-arterial extracorporeal membrane oxygenation (VA-ECMO) was applied. After VA-ECMO implementation about seven hours after cardiogenic shock first occurred, a sufficient circulation could finally be re-established, and function of most organs slowly recovered. She then received high volumes of IV fluids, catecholamines, and haemodialysis was applied due to severe metabolic imbalances.

However, the patient failed to regain consciousness after termination of sedation, and imaging revealed severe brain oedema. Subsequently, organ donation was taken into consideration due to anticipated brain death.

Blood concentrations of taxines were determined. On day one, qualitative detection of Taxin B, other pseudo alkaloids, and the specific marker 3,5-dimethoxyphenole confirmed an active intoxication. On day two, only traces of Taxin B could be found, and on day three Taxin B was not detectable in serum. Consequently, brain death determination was completed, and organ donation could proceed.

hours after ingestion (approximated)	**taxines / Taxin B**	**3,5-dimethoxyphenole**
17.5	detected	detected
39	traces detected	not detectable
69.5	not detectable	not detectable

Discussion

Taxus baccata is one of the most toxic plants in Europe. Fatal outcomes are known after ingestions of large doses, and the suggested lethal dose is about one leaf per kilogram bodyweight. In this case, the ingested quantity therefore led us to expect a severe and potentially fatal intoxication.

Case reports [1][2] have already proven the efficacy of VA-ECMO in yew-intoxicated patients with severe symptoms. It is known that myocardial function can return to normal without sequelae if circulation is bridged by VA-ECMO until the toxin is eliminated.

Our data confirmed these findings: cardiac sonography on day three after intoxication showed a significantly improved myocardial function. Severe kidney failure occurred as a result of prolonged cardiopulmonary resuscitation and required transient hemodialysis treatment. However, renal function recovered rapidly and a post-mortem organ donation of both kidneys was implemented with good postoperative results. Liver donation was not possible due to toxic or ischaemic liver injury resulting from toxin exposure or prolonged reanimation. Lungs donation could not be performed because of severe oedema.

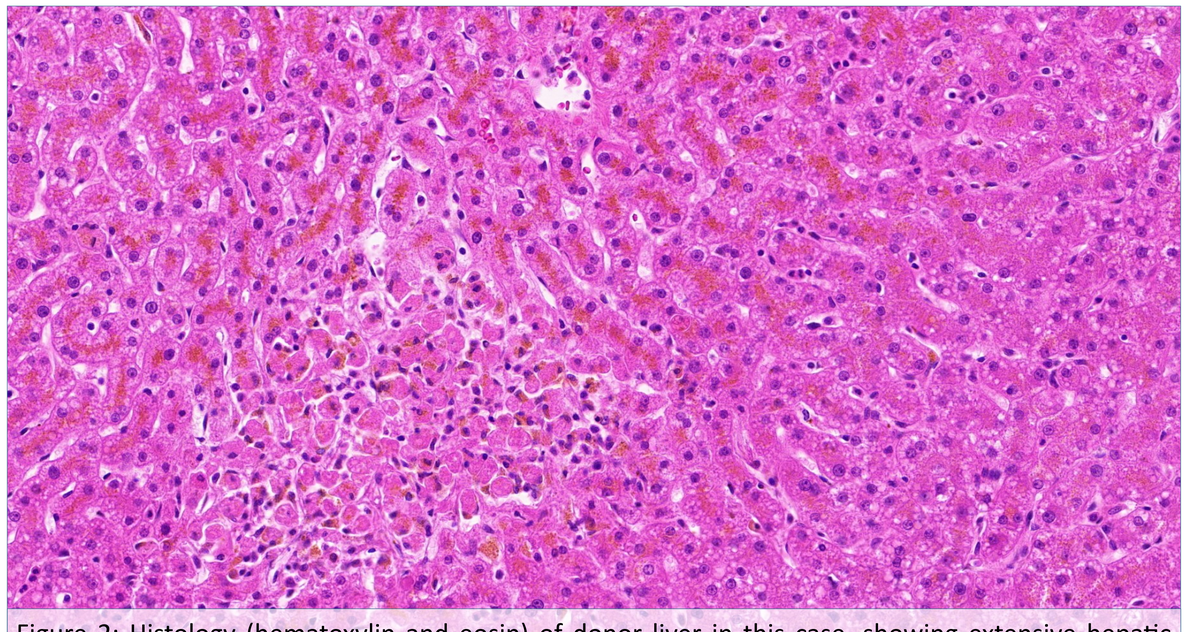

Figure 2: Histology (hematoxylin and eosin) of donor liver in this case, showing extensive hepatic microvesicular steatosis with focal necrotic areas.
Image kindly provided by C. Schwab and C. Flechtenmacher, Department of Pathology, Universitätsklinikum Heidelberg.

Conclusion

Despite extensive therapeutic measures, a fatal outcome in this case could not be prevented as the patient had already developed severe cerebral damage before VA-ECMO was implemented.

Successful organ transplantation was nonetheless possible. After more than six months, both kidney recipients showed good organ function. Therefore, it seems that even after severe yew leaf intoxication, relevant nephrotoxic effects do not occur and kidney transplantation is feasible and safe.

It also seems beneficial for patient survival to consider early application of VA-ECMO in cases of a potentially fatal ingestion.

References

1. Baum et al. Prolonged resuscitation and cardiogenic shock after intoxication with European yew (*Taxus baccata*). Complete recovery after intermittent mechanical circulatory support. Int J Cardiol 2015;181:176-178.
2. Holzer et. al. Two cases of severe *Taxus baccata* poisoning treated with extracorporeal membrane oxygenation (ECMO). [Abstract Nr. 62, EAPCCT 2022] Clin Tox 2022;60(5):29.

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