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Yew tree poisoning: a near-fatal lesson from history

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Case presentation

A 17-year-old girl with a previous history of deliberate self-harm self-presented to accident and emergency after intentionally ingesting a large quantity of yew tree leaves and shoots. She presented feeling nauseous with non-specific symptoms. She was drowsy but rousable with a Glasgow Coma Scale of 14–15/15. On admission, her heart rate was 140 beats per minute (bpm) and blood pressure (BP) was 149/80 mmHg. Routine blood results including urea and electrolytes were normal. Initial electrocardiogram (ECG), about three hours after ingestion, showed sinus tachycardia with evidence of repolarisation change.

Initial management

An hour later she developed pulseless ventricular tachycardia (VT), which persisted despite her receiving an unsynchronised biphasic shock of 150 J. Cardiopulmonary resuscitation (CPR) was commenced and 300 mg of intravenous (iv) amiodarone was administered resulting in termination of the VT. Post-arrest, an ECG (Fig 1) showed widened, slurred QRS complexes with PR prolongation, marked QT prolongation (over 600 ms). Based on the limited Toxbase advice, two vials of Digibind containing 38 mg of purified digoxin-specific Fab fragments per vial were given at this point.

She was admitted to the coronary care unit (CCU) and was profoundly hypotensive (systolic BP 80 mmHg). Inotropes were avoided due to risk of inducing further tachyarrhythmias. Eight-hourly, iv normal saline was initiated. She was catheterised and urine output was monitored. This remained adequate at 30–50 ml/hour. She vomited some remnants of ingested yew and therefore was administered activated charcoal on CCU. A further two and a half hours later she again developed pulseless VT (Fig 2), which resolved only for a few seconds following three unsynchronised, biphasic shocks and a further bolus of 300 mg of iv amiodarone was administered. Spontaneous circulation returned but she was bradycardic at approximately 20 bpm, so she was paced with an external pacemaker at a rate of 60 bpm. A temporary pacing wire was then inserted via the right internal jugular vein for the transient compromising bradycardia. The widened, bizarre QRS morphology with reduced slew rate rendered the pacing device unable to detect intrinsic activity and it ultimately had to be turned off to avoid inappropriate pacing and the risk of 'R on T'. Fortuitously, during the procedure the patient did return to a sinus rhythm with a rate of 72 bpm with persistence of the bizarre ECG morphology. A pacing voltage threshold significantly higher than normanl was required for ventricular capture at this point and the device was set as 5.0 V on-demand pacing at 60 bpm. Cardiac output was maintained but she remained hypotensive and was transferred to the intensive care unit for monitoring.

Case progression

The following day (approximately 24-hours post-ingestion) an ECG showed she was in sinus rhythm at a rate of 90 bpm. Some residual T wave inversion persisted in the inferior and antero-lateral leads but the QRS, QT and PR prolongation had all resolved. Her BP was also normal. On subsequent questioning, she admitted to having recently studied ancient British history at school where she had learnt about Boudica, the warrior queen of the Britonnic Iceni tribe, who had ingested yew leaves after losing in battle to the Romans, preferring to die rather than be taken prisoner. The patient still expressed suicidal intent and was transferred to an inpatient juvenile psychiatric unit. She has now been allowed home and is currently well, with no further suicide attempts.

Discussion

The English Yew or *Taxus baccata* contains the toxic alkaloid taxane, Taxine B that directly antagonises cardiac myocyte

Key learning points

- Early anticipation of cardiac arrhythmias following yew tree ingestion to ensure prompt cardiac monitoring and preparation of pacing equipment.
- Early use of amiodarone in shock refractory ventricular tachyarrhythmias.
- Conservative management of profound hypotension with intravenous fluids and close monitoring, as inotropes may put patient at risk of further tachyarrhythmias.
- Despite it not being licensed for this purpose, the use of Digibind in such cases seems to have beneficial effects and should be administered early.
- Early induction of emesis or use of activated charcoal is also recommended.

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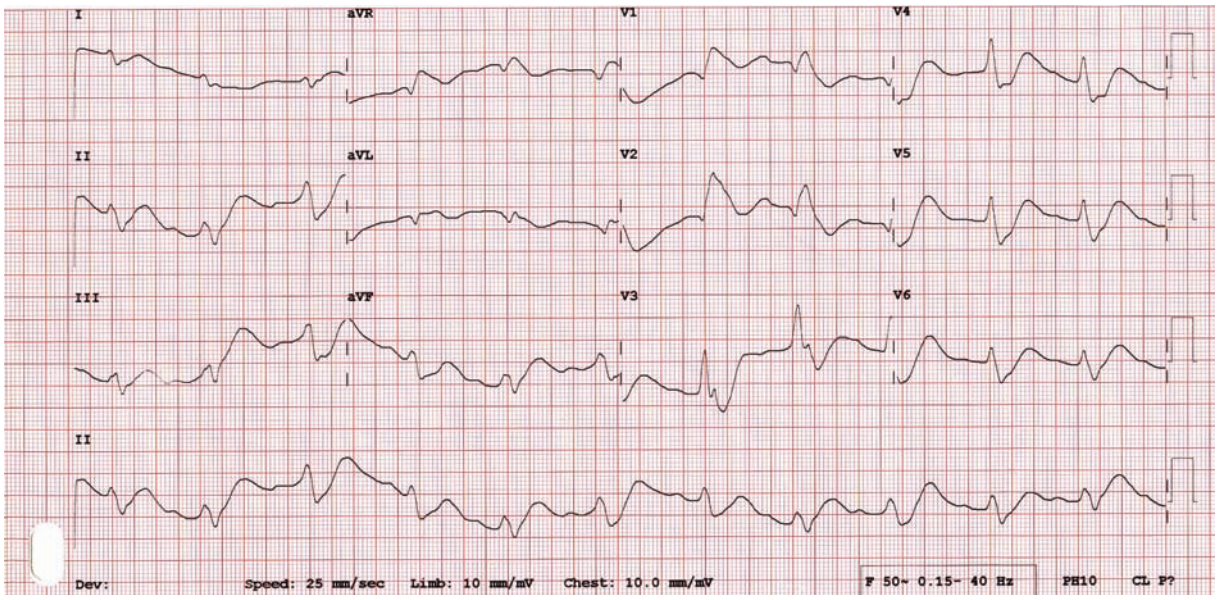

Fig 1. Bizarre ECG changes after initial cardiac arrest, approximately four hours after ingestion of toxin.

Fig 2. Ventricular tachycardia, approximately six and a half hours after ingestion of toxin.

calcium and sodium channels, causing a cardiotoxic increase in cytoplasmic calcium. Animal studies have demonstrated a negative inotropic effect and AV conduction block.[1] Consequently, patients display ECG changes including widened QRS complexes, bradycardia, heart block and ventricular arrhythmias in the presence of normal electrolyte levels.[2] Clinical signs include trembling, dyspnoea and cyanosis, nausea, vomiting, diarrhoea and neurological disturbance. Death usually results from cardiovascular collapse.

There is no known antidote, but it is suggested that emesis should be induced within one hour of ingestion, although recovery of leaves from the stomach can be performed up to several hours after ingestion, due to prolonged gastric transit time. Decontamination with activated charcoal may also be effective. Digibind is suggested as the Taxine molecule has structural similarity to digitalis.[3] There is, however, no guidance on how much should be administered and the two vial dose was based on the product information leaflet recommending this for someone weighing 60 kg. The main focus of this patient's management was the control of her cardiac arrhythmias. The ventricular tachyarrhythmias were resistant to DC cardioversion, presumably as a consequence of the cardiotoxicity of the poison, but did respond to iv amiodarone. The bradycardia was initially managed by temporary external transthoracic pacing and later by transvenous pacing, and as with other reported cases of yew poisoning, her bradycardia was resistant to cardiac pacing.[4] Supportive measures and monitoring were adequate for the hypotension. The effects of the toxin, however, ceased 24 hours after ingestion with return to cardiovascular normality.

Despite their well known cardiotoxicity, taxanes have become a useful chemotherapeutic agent.[5] Although poisoning in this clinical setting is unlikely due to close dose monitoring, ingestion of yew tree leaves, either deliberately or accidentally, is a serious and potentially fatal cause of poisoning. Intensive monitoring, appropriate management of cardiac arrhythmias and resuscitation measures during the first 24 hours is essential to allow the toxin to wash out of the system to ensure survival.

On a rather more philosophical note, it is ironic that in a day and age when pro-suicide websites prey on vulnerable young people with ideas on how to commit suicide, it is in the history books that this patient, a quite gifted student, found her method.

On this occasion it was not a warrior queen losing in battle but a young, troubled, teenager battling her own demons. The philosopher George Santayana wrote, 'Those who cannot learn from history are doomed to repeat it'. In this case, however, our patient did learn from history and by doing so was doomed to try and repeat a lesson that was probably best left in the history books.

References

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