An Accidental Intoxication with *Veratrum album*

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**CASE REPORT:** Veratrum species contain a range of alkaloids that induce bradycardia and hypotension. These alkaloids act by increasing the permeability of the sodium channels of excitable cells, causing them to fire shortly and then leaving them refractory. Early symptoms after ingestion of *Veratrum* plant extracts, such as gentian spirit, consist of vomiting, nausea and abdominal pain. They are followed by severe bradycardia and hypotension.

A 49-year-old man reported an ingestion of two glasses (approx. 2 x 20 mL) of an alcoholic extract supposedly containing yellow gentian (*Gentiana lutea*). Shortly, after ingestion he developed nausea, vomiting and oral paraesthesia. On admission to the hospital he suffered from severe bradycardia (35 min⁻¹) and hypotension (50/30 mm Hg). For primary detoxification he received activated charcoal. Further medications were metoclopramide, ondansetron, atropine and volume. With suspicion of an intoxication with veratrum alkaloids, the spirit and a serum sample were sent to our institute for investigation.

**METHODS:** The identification and quantitation of five *Veratrum album* alkaloids (protoveratrine A (ProA) and B (ProB), veraridine, cevadine and jervine) is based on a liquid-liquid-extraction followed by LC-ESI-MS/MS. Analytical separation was carried out using a Varian Pursuit 5 PFP column (150 x 3.0 mm). The gradient consisted of a mixture of solvent A (methanol: 0.1% HAc with 10 mM NH₄Ac (97:3) and solvent B (0.1 % HAc with 5 mM NH₄Ac:methanol (90:10)). The flow rate was 0.55 mL/min, the oven temperature was 60°C and the analysis time was 6 min. For serum, quantification was performed in the MRM mode using a 5-point calibration (100, 200, 500, 1000 and 1500 ng/L) curve. The LLOQ is 10 µg/L (S/N > 10, extract) and 100 ng/L (S/N > 10, serum). The quantitation of ethanol was carried out using a headspace-GC.

**RESULTS:** Analytical results demonstrated intoxication with alkaloids from *Veratrum album*. In the spirit the ProA concentration was 20.4 mg/L and ProB 13.7 mg/L, respectively. The yellow-coloured spirit contained 25% ethanol, thus indicating, that the extract was homemade. The calibration curves of all compounds were linear (R ≥ 0.995) and the intraday-assay precision CVs (n=2) were < 10% (300 ng/L) and < 14% (800 ng/L), respectively. The serum concentration of ProA was 1160 ng/L and of ProB was 402 ng/L. Veratridine, cevadine and jervine were not detected in either the extract or serum sample. After treatment, the patient completely recovered from symptoms within 24 hours and left the hospital.

**CONCLUSIONS:** A man ingested a homemade spirit containing *Veratrum album*. We report the first quantitative analysis in serum of its components confirming his intoxication with ProA and ProB. After treatment, the patient was discharged from the hospital within 24 hours.

Keywords: *Veratrum album*, Intoxication, LC-ESI-MS/MS