

PLANTS AND TOXINS

Psilocybin Mushroom (*Psilocybe semilanceata*) Intoxication with Myocardial Infarction

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ABSTRACT

Case Report: Intentional intoxication with natural hallucinogenic substances such as hallucinogenic mushrooms continues to be a major problem in the US and Europe, particularly in the harbor complex of northwest Poland (Pomerania). A case is described of *Psilocybe* intoxication in an 18-year-old man resulting in Wolff-Parkinson-White syndrome, arrhythmia, and myocardial infarction. The indole concentrations of hallucinogenic mushrooms may predict the risk for adverse central nervous system and cardiac toxicity.

INTRODUCTION

The abuse of natural hallucinogenic substances continues to be a problem in the US and some countries of Europe, especially in Scandinavia.^{1,2} The results of an investigation of the youth population in Denmark in 1992 by Lassen *et al.* showed that about 3% of university and high school students had used or experimented with *Psilocybe* mushrooms.¹ A number of psychoactive substances are contained in mushrooms growing in the European forests. The highest concentration of psilocybin is

found in the species *Psilocybe semilanceata* (Fr.).³⁻⁵ The most popular species of psychoactive European mushrooms and mean contents of indole alkaloids are presented in Table 1.

The northwest of Poland, Pomerania, geographically situated on the German border with a large harbor complex, is particularly vulnerable to drug abuse and its complications. In the past two years, three serious cases of intoxication by natural hallucinogenic substances have been noted. The case described is presented because of the unusual severity of the toxicity.

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Table 1
*Indole Alkaloid Concentration in Wild
 Hallucinogenic Mushrooms Species
 (Methanol Extraction)⁵*

Species	% Dry Weight		
	Psilocybin	Psilocin	Baeocistin
<i>Psilocybe semilanceata</i>	0.98	–	0.34
<i>Psilocybe bohemica</i>	0.85	0.02	0.04
<i>Psilocybe cubensis</i>	0.63	0.11	0.02
<i>Gymnophilus purpuratus</i>	0.34	0.29	0.05
<i>Inocybe aeruginascens</i>	0.40	–	0.21
<i>Panaeolus cyanescens</i>	0.32	0.51	0.02

Case Report

A previously healthy 18-year-old man was hospitalized after seizures followed by cardiopulmonary arrest. Despite resuscitation and intubation, he remained unconscious, with periodic hyperkinetic activation, dilated pupils, and massive, repeated vomiting in the first three hours. Paroxysmal supraventricular tachycardia during the first six hours was controlled with verapamil. During the past month, he had apparently taken hallucinogenic mushrooms frequently. Initial laboratory data included blood glucose 176 mg/dL, AST 969 U/L, ALT 200 U/L, INR 1.3, total serum protein 59.4 g/L, and CKMB 699 U/L. Arterial blood gas parameters were slightly decreased: pH 7.356, PCO₂ 32.6 mm Hg, and PO₂ 71.2 mm Hg. His hematological parameters, creatinine, BUN, bilirubin, and electrolytes were normal. Toxicological examination was carried out by high performance liquid chromatography diode assay of serum and urine, microscopic (mycological) investigation of gastric contents, and botanical (sporological) identification of dry specimens of mushrooms found near the

patient. By semiquantitative analysis, the serum and urine indole alkaloids were reported as strongly positive. Ethanol, cocaine, morphine, amphetamine, and their metabolites in his serum and urine were not present. In the gastric contents, a number of spores of *Psilocybe semilanceata* were observed. The dry specimens for the botanical and mycological investigation indicated *Psilocybe semilanceata*.

ECG three hours after admission showed regular sinus rhythm 100/min, Wolff-Parkinson-White syndrome, early anterolateral myocardial infarction, and hypokinesia of the para-apical segment of ventricular septum. Tests for HbsAg and HIV were negative. On day 4 of hospitalization, aspiration pneumonia occurred.

Therapy included diazepam, piracetam, aspirin, methandienone, metoprolol, and antibiotics. After 22 days of intensive care, the patient was transferred to the neurology service for rehabilitation of pyramidal and postpyramidal symptoms attributed to the anoxia of cardiopulmonary arrest.

DISCUSSION

Natural indole hallucinogenic (psychodysleptic) alkaloids are known as specific CNS serotonin (5-HT) receptor inhibitors, causing increased neuronal serotonin with simultaneous inhibition of serotonin release from presynaptic terminals.^{3,4,9} In contrast to LSD, psilocybin has no dopaminergic effect.^{6,9} In small doses, psilocybin evokes psychostimulation and anorexia, and experiments have used them in the therapy of body dysmorphic disorders.^{3,4} In toxic doses, psilocybin causes symptoms due to inhibition of CNS muscarinic receptors. Panic, schizophrenic, and obsessive-compulsive disorders have been described.^{2,8,9} Psilocybin acts almost immediately, its biological activity continuing for 2–4 hours, with characteristic, repeated episodes of intoxication symptoms up to 24–48 hours.^{2,4,9,11} End-stage renal failure and neurotoxic effects are described in users of natural hallucinogens.^{3,7–10}

We describe a case of a myocardial infarct in an 18-year-old man with psychodysleptic intoxication. The clinical observations suggest the possibility of cardiac damage related to psilocybin. The mechanisms of cardiovascular toxicity by psilocybin are complex. Indole alkaloids are agonists at the 5-HT receptors in the CNS. Peripherally, the sympatho-

mimetic stimulation is manifest as tachycardia and hypertension.⁹ Use of serotonin agonists in migraine has caused myocardial infarction due to coronary vasoconstriction.¹¹ The 5-HT receptors agonists can also lead to platelet hyperaggregation and occlusion of small coronary arteries.⁹ Both of these mechanisms may have caused myocardial infarction in our patient.

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