



Case Report

Complex suicide with homemade nicotine patches

C. Lardi^{a,b,1,*}, S. Vogt^a, S. Pollak^a, A. Thierauf^a^a Institute of Forensic Medicine, Freiburg University Medical Center, Albertstraße 9, 79104 Freiburg im Breisgau, Germany^b University Center of Legal Medicine, Geneva University Hospitals (HUG), Rue Michel-Servet 1, 1211 Geneva 4, Switzerland

ARTICLE INFO

Article history:

Received 29 August 2013

Received in revised form 13 December 2013

Accepted 15 December 2013

Available online 26 December 2013

Keywords:

Complex suicide

Nicotine

Transdermal application

Diphenhydramine

Self-tying

ABSTRACT

Suicide by self-poisoning is rather common around the world. This paper presents an exceptional complex suicide in which nicotine was applied in the form of self-made patches soaked with an extraction from fine-cut tobacco. In addition, the 51-year-old suicide victim took a lethal dose of diphenhydramine. Toxicological analysis also revealed the presence of tetrazepam in subtherapeutic concentrations. The scene of death suggested an autoerotic accident at first, as the body was tied with tapes, cables and handcuffs. As a result of the entire investigations, the fatality had to be classified as a suicidal intoxication by nicotine and diphenhydramine.

© 2013 Elsevier Ireland Ltd. All rights reserved.

1. Introduction

Nicotine is a very toxic alkaloid that acts as a stimulant for the central nervous system but is also used as a pesticide. It can be extracted from tobacco, containing amounts of 0.5–8.0% by weight. Recipes for its extraction from tobacco are easily found on the Internet [1,2].

Nicotine can be absorbed following inhalation, ingestion or dermal contact. It is biotransformed to inactive metabolites such as cotinine, primarily by the liver. About 5% of the absorbed nicotine are not modified and excreted in urine within 24 h [3,4].

Nicotine binds to nicotine-acetylcholine receptors and effects stimulant and depressant reactions: Low doses stimulate the neural and cardiovascular systems, whereas high doses have a depressive effect. Overdoses can depress respiration and cause death by respiratory failure [5–9]. The ingestion of 40–60 mg nicotine, corresponding to 0.5–1 mg/kg [10], is assumed to be lethal [3].

Deaths related to nicotine uptake, regardless of the absorption route, without any competing cause of death, have been previously

described in the literature [1,11–14]. Those cases refer to the intentional ingestion of nicotine-containing solutions [1,13,14], misuse of nicotine patches for substitution therapy with concurrent cigarette smoking [11] or an overdose through nicotine injection due to failed nicotine tests [12]. Fatal outcomes have also been described after ingestion of nicotine-like substances such as anabasine or imidacloprid [15–18]. Most cases of nicotine toxicity resulted from the oral intake of nicotine-containing mixtures, such as pesticides, and misuse of substitutive patches by children. Toxic dermal absorption has previously been described in tobacco harvesters [19,20]. A recent review of previously published fatal cases of acute nicotine poisoning was presented by Cokery et al. [1]. The victims either ingested nicotine alone [1,13] or both nicotine and alcohol [21]. The review also includes fatalities after nicotine injections [12,22].

Once the organism is used to nicotine, an interruption of the uptake evokes abstinence symptoms. Therefore, transdermal nicotine systems (nicotine patches) are widely used in substitution therapy after cessation of smoking. The absorption of nicotine through the skin is gradual and slow, without the rapid enhancement in the brain that occurs after inhalation [4]. During continuous transdermal application, with the skin acting as a reservoir, the half-life of nicotine is up to 12 h, while after injection a half-life of only 1–2 h was determined [10].

Some drugs may affect the transdermal absorption of nicotine from patches. Sympathomimetic diet pills or decongestants can decrease its penetration through the skin by vasoconstriction whereas vasodilatation induced e.g. by antihypertensive medications, nitrates [23] or alcohol can accelerate its absorption.

* Corresponding author at: Institute of Forensic Medicine, Freiburg University Medical Center, Albertstraße 9, 79104 Freiburg im Breisgau, Germany. Tel.: +49 761 203 6853; fax: +49 761 203 6858.

E-mail addresses: christelle.lardi@uniklinik-freiburg.de, christelle.lardi@hcuge.ch (C. Lardi).

¹ Permanent address: University Center of Legal Medicine, Geneva University Hospitals (HUG), Rue Michel-Servet, 1211 Geneva 4, Switzerland. Tel.: +41 22 379 56 16; fax: +41 22 372 96 53.

Transdermal application may result in toxic concentrations of nicotine. Three fatalities relating to the misuse/abuse of commercial nicotine patches are described in the literature [4,11,24]:

- A 31-year-old woman committed suicide by fixing 18 commercial transdermal nicotine patches (7 mg dose) to various parts of her body before pulling a plastic bag over her nose and mouth [4]. Death was attributed to asphyxia. Nicotine and cotinine concentrations were measured in different samples including cardiac blood, femoral vein blood and urine. The nicotine concentration in femoral blood was 460 ng/ml. In comparison to this, the authors determined a plasma nicotine concentration of about 8 ng/ml after application of a single patch of 7 mg. A ratio for the whole blood and plasma concentration was not given.
- Solarino et al. [24] reported on another suicide by nicotine absorption following dermal exposure as well as ingestion of nicotine, tramadol, diphenhydramine, and paracetamol. In that case, intoxication was mainly due to tramadol, which was measured in concentrations more than twenty times above the therapeutic limit. The peripheral nicotine blood concentration was 600 ng/ml. Diphenhydramine, a substance with sedative and antiemetic properties, was within the therapeutic range.
- Sanchez et al. [11] published a case of nicotine poisoning in a 32-year-old man. Only one nicotine transdermal patch was found on his body, when the medical staff started resuscitation. According to his relatives the man had abused patches while continuing his smoking habit. The man died four days after the incident in an intensive care unit; during the survival time, blood samples were taken and analyzed for nicotine. The plasma nicotine concentrations were extremely high.

Nicotine intoxications after dermal application without fatal outcome are also described in the literature [10,23,25–28]: an 8-year-old child was exposed to a life-threatening dose of nicotine due to a homemade remedy that is traditionally used for eczema in Bangladesh [25]. Blood analysis, 12 h after the onset of symptoms, showed a plasma nicotine concentration of 89 ng/ml. Although this value does not seem particularly high, the child showed severe symptoms.

The clinical signs of nicotine intoxication are only moderately characteristic. Among others, nicotine produces an increase of heart rate and blood pressure as well as vascular constriction. Typical symptoms are nausea, vomiting, and agitation. The condition is easily misinterpreted and related, for example, to an epileptic seizure or acute meningitis [2,25].

In the following, we present a complex suicide using homemade nicotine patches in combination with the oral application of diphenhydramine. To our knowledge, this is the first case involving non-commercial patches.

2. Case report

2.1. Case history

A 51-year-old man was found dead in his apartment after he had not been seen alive for several days. The entrance door was locked, and the blinds were closed. The man was found lying on his bed in a supine position with a blanket covering the body up to the neck. After removal of the blanket, the police found two electric cables running across the abdomen. The cables were attached to each other and knotted to the bed frame. Neither of these cables was connected to an electrical outlet. A pair of handcuffs, one cuff covered with plush, was affixed to the right wrist and to the cables (Fig. 1). The tying primarily suggested an autoerotic accident.

Once undressed, a large black plastic sheet was discovered on the abdomen, the edges of which were fixed to the skin with adhesive strips. The front sides of both thighs also showed several



Fig. 1. Handcuffs and cables at right wrist.

plasters (12 in total) of a dark brown color. Below the sheet on the abdominal skin, there were soaked compresses containing dark brown particles with a sweet tobacco smell. The same material was applied to the inner surface of the plasters on the thighs (Fig. 2). A glass containing similar brownish material was found on a table next to the body.

2.2. Autopsy findings

2.2.1. External examination

Autopsy was performed four days after discovery of the body (weight 68 kg, height 169 cm). The external examination yielded



Fig. 2. Anterior aspect of the body after removal of the clothes and the plastic sheet which originally had covered the abdomen (now positioned between trunk and left forearm). Two compresses soaked with brownish fluid have remained in place on the right abdominal wall. Initially, 12 plasters were fixed to the thighs.

Download English Version:

<https://daneshyari.com/en/article/95636>

Download Persian Version:

<https://daneshyari.com/article/95636>

[Daneshyari.com](https://daneshyari.com)