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BRIEF REPORT

Drug facilitated crimes by “burundanga” or scopolamine ☆



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KEYWORDS

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Abstract

Introduction: *Burundanga* or potion with scopolamine is a substance that has gained great notoriety in cases of drug facilitated crimes (DFC). San Carlos Clinical Hospital (SCCH) has a clinical practice guide in suspected DFC. The toxicological analysis (TA) is carried out at the National Institute of Toxicology and Forensic Sciences (INTCF) in Madrid.

Objective: To analyze cases of suspicion of DFC due to scopolamine in SCCH.

Methods: Retrospective observational study of cases registered as possible SQ in the HCSC with scopolamine identified in the toxicological analysis (TA) between March 2015 and 2021.

Results: In only 1 of 292 (0.3%) records in the SCCH were identified scopolamine (128, ng / mL) in urine using liquid chromatography techniques coupled with mass spectrometry. A 34-year-old man was referred to the emergency room for anticholinergic symptoms, referring to a crime against property.

Conclusions: Scopolamine is a substance identified in an exceptional way in cases of suspected SQ in SCCH.

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PALABRAS CLAVE

Sumisión química;
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Sumisión química por «burundanga» o escopolamina**Resumen**

Introducción: La *Burundanga* o brebaje con escopolamina ha acaparado gran notoriedad en los casos de sumisión química (SQ). El Hospital Clínico San Carlos (HCSC) dispone de una guía de práctica clínica ante la sospecha de SQ. El análisis toxicológico (AT) se realiza en el Instituto Nacional de Toxicología y Ciencias Forenses (INTCF) de Madrid.

Objetivo: Analizar casos de sospecha de SQ en el HCSC con detección de la escopolamina en el AT.

Métodos: Estudio observacional retrospectivo de casos registrados como posible SQ en el HCSC con presencia de la escopolamina identificada en el AT entre marzo de 2015 y de 2021.

Resultados: En solo 1 de 292 (0,3%) registros en el HCSC se identificó escopolamina (128,ng/mL) en orina mediante técnicas de cromatografía de líquidos acoplada a espectrometría de masas. Un varón de 34 años fue atendido en Urgencias por síntomas anticolinérgicos refiriendo delito contra la propiedad.

Conclusiones: La escopolamina es una sustancia identificada de manera excepcional en casos de sospecha de SQ en el HCSC.

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Introduction

Chemical submission (CS) is an emerging health problem and a form of violence. Although the phenomenon has been known since antiquity, it still remains largely hidden. CS may include proactive cases following the surreptitious administration of substances, together with opportunistic cases of CS (which are also known as *chemical vulnerability*) after the voluntary consumption of toxic substances, as well as mixed situations in which the two previous types are combined.¹

Problems have been identified within the medical–forensic field in emergency care for patients who have been victims of CS,² leading to the proposal for a medical–forensic action guide.³ The first cases of CS associated with drug facilitated sexual assault (DFSA) were detected.⁴ Given the above considerations, in Hospital Clínico San Carlos (HCSC), Madrid, a clinical practice guide was prepared and the first cases were notified. The majority of these cases had a sexual purpose, although one had the purpose of robbery.⁵ Toxicological analysis (TA) was undertaken in the National Institute of Toxicology and Forensic Science (INTCF), Madrid.

Burundanga is a drink of Afro-American origin, composed chiefly of scopolamine extracted from Solanaceae-family plants such as *Datura stramonium*, *Hyoscyamus niger*, *Datura arborea* or different species of the *Brugmansia* genus, among others. This alkaloid binds to muscarinic receptors through competitive non-selective antagonism. It produces anticholinergic symptoms at a peripheral level, including mydriasis, tachycardia, a fall in gastrointestinal mobility or urinary retention. As it is able to pass through the blood–brain barrier it binds to central muscarinic receptors, causing confusion, agitation, delirium and anterograde amnesia. Its supposed use in cases of CS has been reported in recent years, acquiring great notoriety in the media and social networks. Although there are references to its use in Latin America,⁶ its actual impact in our area is unknowns.

We therefore designed a study with the aim of analysing the cases registered in the HCSC in which CS was suspected and scopolamine had been identified by TA.

Methodology

An observational retrospective study was undertaken of cases in the HCSC from 1 March 2015 to 1 March 2021 in which there was a suspicion of CS. CS was understood to refer to patients seen in the Emergency Department who described a possible exposure to psychoactive substances which involuntarily altered their will and/or facilitated an alleged basically sexual offence and/or robbery. The HCSC has a registry of cases involving suspected CS which is included in the registry approved by the Hospital Commission Against Violence.

Patients aged 18 years or over were included who had been registered in the HCSC with suspected CS during the study period. Following the protocol for action, biological samples (blood and urine) were stored respecting the chain of custody and they were sent to the laboratories of the Madrid Department of the INTCF. The reports on injuries were sent to the court, and victims were recommended to report to the police. In cases of suspected sexual violence, the UFAM was asked to supply an assessment with the aim of continuing evaluation by the Forensic Doctor, usually in La Paz Hospital, according to the applicable procedure. The TA undertaken in the INTCF is exhaustive, and among many other substances, it makes it possible to identify scopolamine in blood and urine samples by liquid chromatography coupled to mass spectrometry.

This work reviewed the TA reports issued by the INTCF in all of the cases registered in the HCSC that sought to detect scopolamine, followed by the clinical history of the case in the Emergency Department. All of the patients had given

their informed consent to the taking of biological samples, the use of TA and subsequent notification of the results, as well as the duly “anonymised” use of the same for research purposes. This study was approved by the Hospital Research Ethics Committee (C.I. 17/522-E).

Results

Of the total of 292 cases of recorded suspicion of CS seen in the HCSC Emergency Department during the duration of the study, a substance was identified in 248 (84.9%) cases, and ethylic alcohol was present in 127 (43.5%) of them. Only 1 case (0.3%) of suspected CS with scopolamine was found, and this was confirmed in the TA described below.

Clinical case

A 34 year-old male, without any relevant medical–surgical history nor the habitual consumption of drugs or toxic substances, was taken to the Emergency Department of the HCSC in January 2020 after being treated in the public highway for psychomotor agitation. The patient stated that approximately 8 beforehand he had been at home in the company of another male aged about 25 years old, having contacted him through social networks using a dating application. After consuming some beers supplied by his guest, the patient describes blurred vision, difficulty walking, abdominal pain and the feeling of a dry mouth, followed by a period of amnesia until he woke several hours later in his home, alone, disorientated and agitated. He suspects that his guest may have administered a toxic substance in the drink, as he states that he would never have voluntarily consumed drugs. He reported the theft of his belongings and offered no data that would suggest that he had suffered sexual aggression. Physical examination found reactive mydriasis and behavioural symptoms without a neurological basis that required mechanical restraint and chemical control with 5 mg intramuscular haloperidol due to the risk of self-harm or harming others. Blood analysis revealed discreet leucocytosis, while the electrocardiogram showed sinus tachycardia and thoracic radiography showed no alterations. Urine analysis took place in the hospital itself for toxic substances, and it was negative for amphetamines, barbiturates, benzodiazepines, cannabis and cocaine. The CS suspicion protocol was activated, and after several hours of observation the patient was discharged from the Emergency Department. The TA carried out in the INTCF identified scopolamine (128.2 ng/mL) and haloperidol in urine. No substances of toxicological importance were detected in the blood sample.

Discussion

Scopolamine is a substance that is identified exceptionally in cases of suspected CS in the HCSC.

A review of the recent scientific literature found hardly any references to scopolamine identified by TA. In the first case from 2012, De Castro et al.⁷ described how a middle-aged nurse reported her lover for a possible case of DFSA suffered months previously. Scopolamine was found in her

hair, but the final verdict identified the substance as originating from external contamination. Four years later, Gomila et al.⁸ published the first confirmed case of CS by scopolamine in our country. A 36-year-old woman was seen in a Hospital Emergency Department due to anticholinergic symptoms, with the suspicion of possible CS by her ex-partner. 899 ng/mL of scopolamine was found in her urine. More recently, Barceló et al.⁹ described the case of a 51-year-old woman with mydriasis and low level consciousness after exposure to an alcoholic drink in her home. 8.4 ng/mL was found in her blood in the first hour, and up to 199 ng/mL was found in urine 3 h after the event. Outside our country, Le Garff et al.¹⁰ published the case of a 35-year-old male who died following a journey to Indonesia. The autopsy in France found 5 ng/mL scopolamine in the vitreous humour. The guide who had accompanied the victim admitted having administered scopolamine to him. Lusthof et al.¹¹ describe a series of 3 cases of CS and robbery by the same attacker in the Netherlands. The first case died, and 300 ng/mL scopolamine was found in blood from the autopsy. In the second case, scopolamine was found in the urine and hair 12 h and more than approximately 2 months after exposure, respectively. The third case consulted at an early stage, and 0.35 ng/mL scopolamine was found in the blood. Lastly, we emphasise the work of Dufayet et al.,¹² in which they describe how a 58-year-old male with anticholinergic symptoms was attacked in the face with powder by an unknown assailant in the public highway in France. 7 ng/mL scopolamine was found in the blood and 510 ng/mL in the urine.

The diagnosis of exposure to scopolamine is complex. No rapid screening test is available, and highly sensitive techniques have to be used, such as high resolution liquid chromatography coupled to mass spectrometry (LC-MS/MS), which are available in highly specialised centres such as the INTCF. The window for the detection of scopolamine is also narrow.¹³ After an oral dose of 0.415 mg of basic scopolamine was given to 10 volunteers, plasma concentrations measured at 5 h had fallen to levels close to 0.15 ng/mL,¹⁴ a concentration that it is hard to detect using habitual toxicological screening techniques. Balikova was able to detect far higher concentrations in the urine of 28 individuals intoxicated by an infusion containing scopolamine, atropine and harmine.¹⁵ In this case, the average found amounted to 13 ng/mL 6 h after the ingestion of the said infusion, showing that a urine sample is able to offer us a far wider detection window than is the case for blood, as could be expected.

Early sample-taking in the Emergency Department is associated with a higher probability of positive results in TA.¹⁶ Furthermore, it makes it possible to detect new emerging psychoactive substances involved in cases where there is a suspicion of CS, such as ketamine, GHB or cathinones such as alpha-PVP¹⁷ or ayahuasca,¹⁸ which are not detected by conventional hospital analytical techniques.

In spite of these difficulties, it is possible that the use of burundanga or scopolamine is far less widespread than is generally claimed in the media and social networks.

Before ending, we recognise the limitations of this work, as they are intrinsic to the methodology used and a single-centre study. It is possible that some cases of CS using scopolamine have not been identified or have not been

published due to legal reasons. Nevertheless, we consider this work to be a new contribution that may shine some light on a controversial subject.

Although CS is a challenge for forensic toxicologists,¹⁹ this is also the case for clinical specialists. The existence of action protocols in cases of suspected CS which call for the collaboration of clinical medical staff and legal and forensic medicine specialists as well as highly specialised laboratory personnel is of key importance in discovering the real nature of a situation which, for the majority of medical professionals and society itself, is still hardly visible.

Conflict of interests

The authors have no conflict of interests to declare.

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