

Science and Justice

Letter to the Editor

Scopolamine: Useful medicine or dangerous drug?

Dear Sir

Media stories [1,2] have provided lurid accounts of the use of scopolamine, commonly known as 'burundanga' when allegedly used to facilitate sexual assault and robberies. There is little doubt that when used in sufficient quantity, and added to food or drink, scopolamine has the ability to incapacitate. In Norway in 2008, there was an epidemic of poisoning caused by tablets containing scopolamine sold and used under the impression that they were Rohypnol® tablets [3]. On the other hand, suggestions that scopolamine can be unwittingly absorbed by skin contact with impregnated cards are considered to be a myth [4].

Sáiz et al. [5] have described a novel method of analysis suitable for a variety of matrices based on capillary electrophoresis that allows separation of scopolamine from atropine, both of which are found in numerous plants of the family *Solanaceae*. We suggest that their paper, unfortunately, contains a number of misleading statements.

Scopolamine is more formally known as hyoscine, the International Non-Proprietary Name (INN). The use of the anticholinergic hyoscine hydrobromide in sub-milligramme doses in tablets and transdermal devices for the treatment of motion sickness is well-known. Hyoscine-containing preparations have been used as antidotes against cholinergic nerve gas poisoning [6]. Hyoscine butylbromide is found in proprietary products (e.g. Buscopan®), where a dose of 10 mg or more is used to control intestinal and other smooth muscle spasms, for the symptomatic relief of irritable bowel syndrome and as a premedication in anaesthesia. The statement by Sáiz et al. [5] that "its active dose is very close to the lethal dose" is not supported by the finding that fatalities after hyoscine poisoning are rare [7].

Sáiz et al. [5] go on to state that "scopolamine has become a drug of common use for recreational and predatory purposes" and that it "has become a drug of increasing use in Europe". There is no evidence, of which we are aware, for either statement. No instances of scopolamine abuse in the European Union have been reported to the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA). A report from Spain by Nogué-Xarau [8] described the clinical and legal implications of "submission agents". That study included 170 presumed victims of sexual aggression; all were tested for scopolamine and all were negative. Recreational use of medicinal products containing hyoscine is almost unknown. Although some individuals may occasionally be tempted to consume the seeds of e.g. *Datura stramonium* L. (known in the United Kingdom as 'Thorn Apple' and in United States as 'Jimson Weed') the effects are generally regarded as unpleasant.

There is limited scientific evidence that scopolamine is used for criminal purposes. In some ways, the situation is reminiscent of allegations that flunitrazepam (Rohypnol®) and other more exotic

substances are used for similar predatory purposes; closer investigation generally finds that the incapacitating agent was alcoholic liquor. Several reports from Colombia have described the alleged criminal use of scopolamine [9–11], but all lack toxicological data. Ardila and Moreno [12] noted that in an earlier investigation by Pena, Puentes and Arenas [13], 50% of hospital patients in Colombia suspected of scopolamine poisoning tested positive in urine. However, it is not clear that these were anything other than self-poisonings. Ardila and Moreno [12] provided three case reports, two of which had positive tests for scopolamine, although the body fluid/tissue was not specified. Only one of those cases had an allegation of criminal activity, involving a cab driver who had a spray applied to his face. Although scopolamine can be absorbed through dry skin (it is available as transdermal devices for treating motion sickness), Ardila and Moreno [12] concluded: "However, the clinical picture observed with Burundanga intoxication may be not only the result of scopolamine action, but also due to benzodiazepines and often alcohol combination (Mickey Finn effect)". Goldstein [14] reported on the use of the Mickey Finn defence in a criminal case in New York City where an off-duty police officer had allegedly been drugged with scopolamine in a bar. The officer had shot one of the patrons for no apparent reason. The prosecution argued that, in the absence of any physical corroboration (i.e. finding scopolamine in the officer's blood or urine), the defence had to rely on the officer's self-serving subjective account of the symptoms he had experienced, which might have been fabricated in order to convey the false impression that he was the victim of scopolamine poisoning, rather than admitting to voluntary intoxication with alcohol.

It may be significant that almost all allegations concerning the criminal use of scopolamine seem to originate from Colombia, a country where ritual/shamanic use of plants from *Datura*, *Brugmansia* and related solanaceous plants is well-known [15]. In terms of its alleged criminal use, we suggest that until toxicological evidence can be published, scopolamine remains innocent until proven guilty.

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