

CASE REPORT

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Homicidal poisoning with halothane

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Abstract A double homicide by smothering with halothane-moistened towels is described and the blood and tissue concentrations of halothane are discussed in comparison to the literature.

Key words Smothering · Halothane · Homicidal poisoning · Tissue concentrations

Introduction

While several reports on criminal narcotization or even homicide as a result of chloroform poisoning have been published over the last 100 years [1, 2, 6, 11], a double homicide by smothering with halothane-moistened towels had not come to our attention and only very few reports on halothane concentrations in tissues after i.v. or peroral (suicidal) or accidental ingestion have been published [3, 5, 7, 8, 10].

Halothane (2-bromo-2-chloro-1,1,1-trifluoroethane) is a well known volatile anaesthetic agent. However, considerable disadvantages are described by virtue of producing dose-related depression of the cardiovascular and respiratory system [4, 9].

Case report

According to the confession of one of the two suspected offenders they facilitated a robbery from an antique dealer by poisoning of a 75-year-old man and his 82-year-old companion by forced inhalation of an anaesthetic substance. While one man diverted the antique dealer the other moistened a towel with the agent from a dark green bottle containing 100 ml of the substance and then placed it over mouth and nose of the woman by force. The woman immediately became unconscious and the free ends of the towels were

knotted behind her head. Then the offender entered the room with the old man and, having prepared another anaesthetic-moistened towel, forcibly placed it over the mouth and nose and knotted the free ends of the towel behind the head as well (Fig. 1 a,b). Before the men left the house after the robbery the anaesthetic gags were removed.

A few weeks later, a dark green 100 ml bottle still containing 25 ml halothane was found due to the confession of one of the of-



Fig. 1 a,b Victims as found at the scene

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Fig. 2 Abrasion-type injuries of nose and upper lip of the 75-year-old male

fenders. The offenders had believed the contents of the bottle to be ether.

Autopsy findings

The autopsy (24 h postmortem) of the 75-year-old man and 82-year-old woman revealed signs of external violence with abrasion-type injuries on the nose, cheeks, and perioral regions, some small hematomas and lacerations of the lips and oral mucosa and petechial bleedings of the conjunctivae (Fig. 2). Preexisting diseases found were advanced atherosclerosis of the aorta and the great vessels and pulmonary emphysema in both victims.

Toxicological findings

The headspace gas chromatograph used was a Perkin Elmer Model 8500 equipped with a flame ionization detector and a steel column (4 m, 1/8") packed with 5% Carbowax 20M on a Carbowax B (60/80 mesh, Supelco/Inc.). The carrier gas was N₂ at a flow-rate of 40 ml/min. Temperature settings were 170 °C for the injector, 250 °C for the detector and the oven temperature was programmed from 70 °C up to 170 °C. Prior to injection to 1 ml or 1 g of homogenized biological sample, 2 g of sodium sulphate was added into a 20 ml headspace vial and incubated for 45 min at 80 °C. Aqueous calibration standards of halothane were prepared in the same way and the calibration curves showed a good linearity over a concentration range of 1–100 mg/l with a coefficient of correla-

tion of 0.996. Analysis of spiked blood samples revealed no matrix effects.

The analysis of halothane was performed 3 months postmortem and the specimens had been stored at –20 °C until analysis. The toxicological investigations on blood, other body fluids and tissues revealed the halothane concentrations given in Table 1. Although the blood concentrations in these two fatal cases after forced inhalation of halothane were much lower than during halothane anesthesia (22–84 mg/l) there is no doubt that both victims died of forced inhalation of halothane. Halothane was rapidly distributed, mainly into the brain, but the forced inhalation was survived only for a few minutes. Both victims must have become rapidly (within seconds) unconscious (no defence injuries).

Discussion

The minimal lethal dose of halothane after ingestion or inhalation is given as 10 ml. The blood concentrations in these cases were reported from 7 up to 310 mg/l. In a case of suicidal poisoning with halothane, 35 ml were ingested orally [10] and much higher tissue concentrations were found (Table 1). In a case of i.v. injection of halothane, survived for some hours, blood concentrations were slightly higher than in our cases [3]. In cases of chloroform poisoning, tissue concentrations were also much higher after oral ingestion than after forced inhalation [6].

In the case described here the 100 ml bottle contained only 25 ml and the missing volume of 75 ml could be assumed to be enough to induce a lethal outcome in two persons after forced inhalation. Halothane was inhaled in much higher concentrations than during anesthesia (0.5–1.5 Vol%) with a rapid increase of concentration. However, in our case additional lethal factors, namely suffocation by occlusion of mouth and nose (abrasion-type injuries of the face) and lethal arrhythmia secondary to cardiac sensitization to catecholamines during the assault with forced inhalation of halothane, have to be taken into account [4]. Furthermore, both victims were much older than in other reported cases and also revealed accompanying preexisting diseases. Additionally, a slight decrease of concentration after tissue/fluid storage has to be taken into consideration, because the material was not stored under strict anaerobic conditions (no suspicion of volatile poisons during the autopsy).

Table 1 Halothane levels in blood and tissues in the victims compared to those found in the literature

	S 195/96 82 y female	S 196/96 75 y male	Spencer/Green (1968) 19 y male	Berman/Tattersall (1982) 42 y male	
Mode of Ingestion:	Forced inhalation of halothane		oral ingestion	i.v. injection	
Survival period:	a few minutes		?	some hours	
Blood	6.7	3.4	650	7.9	mg/l
	8.3	3.2			
Liver	1.7	21.3	880		mg/kg
Kidney	11.7	14.5			mg/kg
Brain	103.6	120.2	1560	1.58	mg/kg
Urine	0.0	0.0	20		mg/l
Bile	8.6	1.6			mg/l
Stomach		10.3	240		mg/kg

The cause of death in both cases was given as halothane poisoning due to forced inhalation and the manner of death as homicide. Both suspects were convicted of aggravated robbery with fatal outcome according to §§ 250, 251 of the German penal code and sentenced to longterm imprisonment (11 years 9 months and 14 years, respectively).

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