Int J Legal Med (1996) 108 : 191–193

ORIGINAL ARTICLE

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Trichloroethanol is not a metabolite of alpha chloralose

Received: 8 September 1995 / Accepted: 26 October 1995

Abstract Head space capillary gas chromatography was used to detect alpha chloralose and its potent metabolite, trichloroethanol in clinical and forensic cases. Although alpha chloralose was identified in blood and urine in all cases, trichloroethanol was never detected. In a fatal case the alpha chloralose concentration in blood was 151.3 mg/l. It was concluded that trichloroethanol is not a metabolite of alpha chloralose.

Key words Alpha chloralose · Trichloroethanol · Poisoning · Metabolism

Introduction

Alpha chloralose is formed by the condensation of glucose with chloral. The drug is used as a rodenticide to kill mice, rats and moles, and in the control of bird pests [1, 2]. Alpha chloralose possesses central depressant effects producing sedation and anaesthesia as well as a stimulant action.

Reports on cases of human poisoning state that the effects of alpha chloralose overdose are sedation, respiratory depression, myoclonic convulsions, flat EEG tracing and hypotension [3–5]. Fatal intoxications are seldom encountered and there is a lack of literature reports. Only Schmid and Iten [6] described one case in which the peripheral blood concentration was 410 mg/l.

A recent lethal poisoning led us to investigate the metabolism of alpha-chloralose. Several authors [1, 4, 7] indicated that chloralose is first metabolized to chloral, then to trichloroethanol. The same affirmations were found in the Poisindex (R) Substance Identification database [8]. In contrast, others reported that chloralose is not metabolized but is excreted mainly unchanged or as the glucuronide [3, 5, 6].

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The present cases clearly demonstrated the lack of metabolism of chloralose to trichloroethanol.

Materials and methods

Case reports

Plasma and urine samples were obtained from four clinical cases on admission. The patients, aged 34–56 years, were admitted to hospital during the last 2 years and all recovered after supportive care.

In a forensic case, a white 48-year-old male (height 1.75 m, weight 95 kg) was found lying dead in a forest and two empty bags of Souricide (alpha-chloralose) were discovered near the body. The subject was known to be depressive. At the autopsy, no particular morphological changes were noted. Specimens of peripheral blood, urine and stomach contents were collected for toxicological analysis.

Toxicological analysis

Chloralose and trichloroethanol were analysed using a procedure modified from the method of Breimer et al. [9]. Free chloralose and trichloroethanol were directly analysed by the head space method using 1 ml of the sample. Conjugated drugs were evaluated by comparison with total drugs obtained after hydrolysis with 1 ml of concentrated sulphuric acid at 60° C for 3 h. After volatilization of the target drugs in the presence of 20 µl of tetrahydrofuran (100 g/l) used as internal standard during 20 min at 80° C in the sealed head space vial, a portion of the vapour was injected into a RSL 150 capillary column (30 m × 0.32 mm). The GC system consisted of a Perkin Elmer GC 9000 HS40 chromatograph and a flame ionization detector. Injector temperature was 150° C with a nitrogen head pressure of 9.0 psi. Detector temperature was 250° C. The column oven temperature was programmed to rise from an initial temperature of 45° C, maintained for 11.50 min, then a rise to 200° C at 39.9° C/min, kept for the final 3 min. Retention times were 10.44, 13.87 and 16.18 min for the internal standard, chloralose and trichloroethanol, respectively. Detection limits were 0.5 mg/l for both compounds.

Results and discussion

A typical plasma sample, with a chloralose concentration of 28.6 mg/l is presented in Fig. 1. Under the chromato-

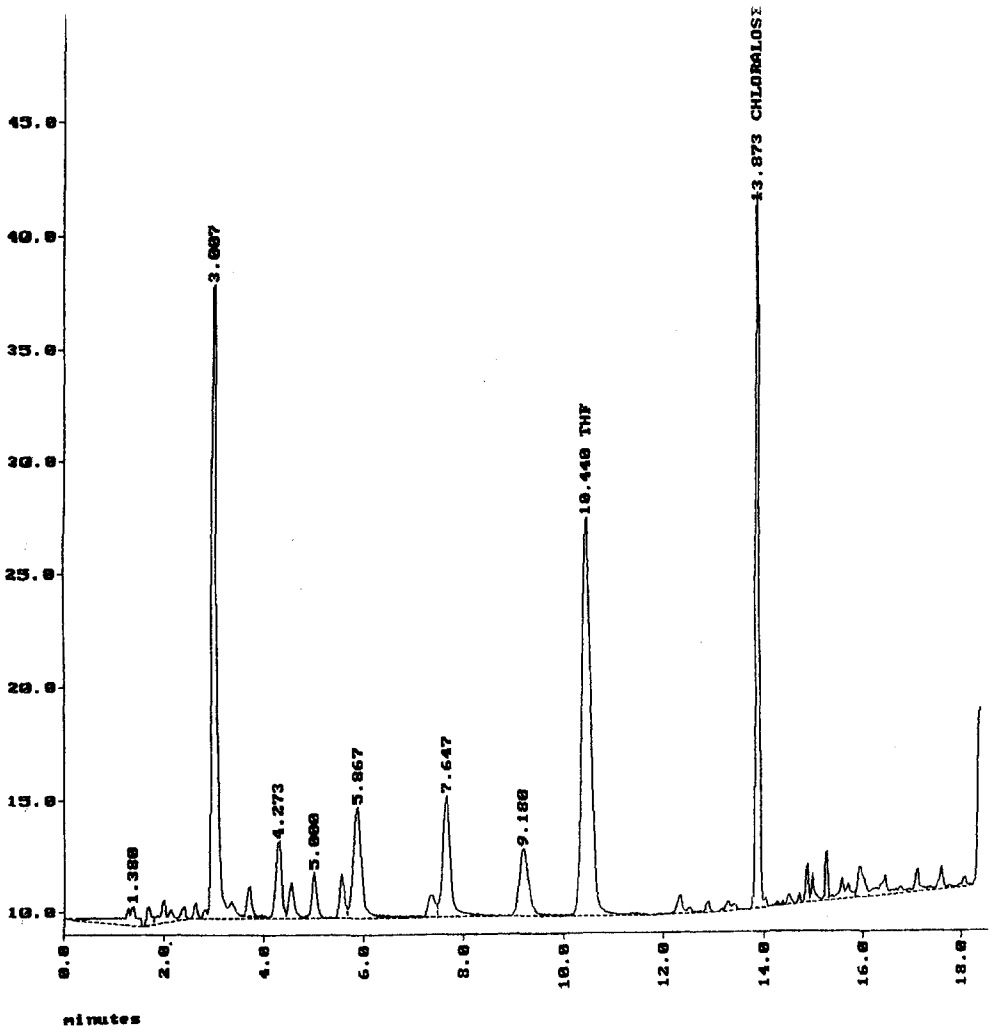

Fig. 1 Typical plasma chromatogram with a chloralose concentration of 28.6 mg/l

Table 1 Chloralose concentrations (mg/l) observed in four poisoning cases

Case	Plasma	Urine (free)	Urine (conjugated)
1	13.7	58.2	634
2	28.6	24.9	126.3
3	41.3	111.4	587.9
4	17.9	31.5	28.9

Table 2 Chloralose concentrations in post-mortem samples

Sample	Concentration (mg/l)
Femoral blood	151.3
Gastric contents	8162.4
Urine (free)	287.6
Urine (conjugated)	1132.9

graphic conditions used, there was no interference from any volatile endogenous product. Free and conjugated chloralose were identified in all four clinical cases (Table 1) and trichloroethanol was not detected in any of the urine samples.

No other drugs were detected in the autopsy samples by systematic toxicological analysis. Chloralose was detected in all the post-mortem samples (Table 2). The blood concentrations were lower than those reported by Schmid and Iten [6], and trichloroethanol was not detected.

Our results suggest that there is no hydrolysis of chloralose to chloral hydrate and then to trichloroethanol. Chloralose seems to be excreted in urine mainly as glucuronide and only in small amounts as the unchanged compound.

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