# CASE REPORT

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# An Infant Fatality Involving Ajmaline

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**ABSTRACT:** An infant fatality following accidental ingestion of ajmaline is described. Ajmaline was determined by thin-layer chromatography and infrared spectrophotometry, and quantitated by high performance liquid chromatography. The ajmaline concentration in blood was 5.5 μg/mL. The toxicological data relevant to the interpretation of case findings are presented.

**KEYWORDS:** toxicology, ajmaline, chromatographic analysis, infrared spectrophotometry

Ajmaline, the therapeutic agent for cardiac arrhythmias, is a pure alkaloid isolated from Rauwolfia. It diminishes cardiac excitability, slows down the heart rate, and increases the atrioventricular (A-V) conduction time [*1*]. This report presents the toxicological data including analytical findings of ajmaline in an infant death case associated with ajmaline.

## Case History

A 4-year-old girl was playing with dishes and prescription bottles when she suddenly became pale, vomitted, and soon experienced diarrhea. She was treated at a hospital, but died about 3 h after ingesting the drugs. Later, the police investigated all of her mother's drugs and found 17 ajmaline tablets (50 mg each) missing.

## Autopsy Findings

An autopsy was performed in the following morning. The decedent was 102 cm tall and weighed approximately 16 kg. Examination of the external surface of the body revealed no signs of trauma. There were no gross abnormalities of the inner organs other than bilateral

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edema and congestion of lungs. The urinary bladder was collapsed and contained no fluid. Blood, brain, liver, and stomach contents were taken for toxicological analysis.

## Toxicological Analysis

### *Thin-Layer Chromatography (TLC)*

Extracts from blood, brain, liver, and stomach contents along with standard solutions were spotted on a silica gel 60 plate (E. Merck and Co., Darmstadt, W. Germany). After developing in a tank saturated with methanol: acetone: ammonium hydroxide (50:50:1.5), the spots were visualized under ultraviolet light (254 and 360 nm). The $R_f$ value of ajmaline from blood, brain, liver, stomach contents, and the standard was 0.52.

### *High Performance Liquid Chromatography (HPLC)*

Samples for HPLC were extracted from blood, brain, liver, and gastric contents by using Dombrowski's method [2]. Thirty millilitres of blood and ten grams each of brain, liver, and stomach contents were used. Extracts from each specimen were dissolved in 0.2 mL of mobile phase. The standard was prepared by dissolving 2 mg of ajmaline in 5 mL of mobile phase. HPLC was performed on a Hitachi Model 655 equipped with Model 638-41 variable wavelength detector and a Model D-2000 Chromato-Integrator.

Analysis was performed at ambient temperature using a 4.6-mm diameter by 250-mm length Zorbax® CN column (E.I. Dupont de Nemours and Co.). Injections of 10 $\mu$L (samples from blood, brain, liver, and stomach contents) and 25 $\mu$L (sample from standard) were examined by HPLC using the following parameters: mobile phase was hexane: ethanol: ethanolamine (83.18:16.79:0.03 by volume), flow rate was 1.5 mL/min, detector wavelength was 235 nm, and attenuation was 128 mV (for samples from blood, brain, liver, and standard of ajmaline) and 256 mV (for sample from stomach contents) full scale. The retention times for the samples from blood, stomach contents, and standard were 8.15, 7.92, and 8.11 min, respectively (Fig. 1). However, fine peaks could not be obtained for the samples from brain and liver by using Dombrowski's method. The peak areas ratios for the samples from blood and stomach contents were used to calculate ajmaline concentrations using the factor obtained from that of standard.

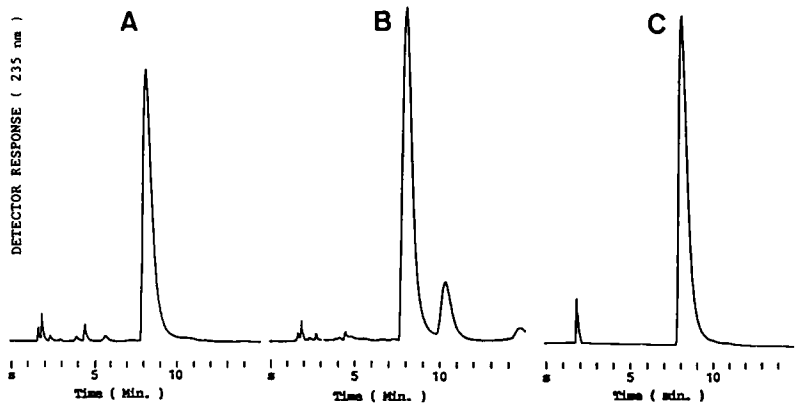


FIG. 1—*High performance liquid chromatograms:* (a) *extract from blood,* (b) *extract from stomach contents, and* (c) *extract from standard of ajmaline.*

*Infrared Absorption Spectrophotometry*

Ajmaline was confirmed by infrared absorption spectrophotometry. Residue samples were obtained by evaporating the mobile phase from the samples and the standard for HPLC. Figure 2 provides the infrared spectrum of the blood extract. The major intensities of absorption were marked at 1605, 1460, 1295, 760, and 740 $cm^{-1}$. This spectrum was compared with that of a sample from a standard of ajmaline (Fig. 3) and a published reference spectrum [*3*], and a marked similarity to that of ajmaline was noted.

*Toxicological Findings*

The ajmaline concentration was 5.5 μg/mL for blood and 178.2 μg/g for stomach contents, respectively. The total recovery from stomach contents was 46.3 mg.

## Discussion

The estimated lethal dose of ajmaline in man is within the range of 100 to 500 mg/kg [*4*], and its toxicity appears rather low. Though suicidal or accidental intoxications of ajmaline have been reported [*1,4-6*], fatalities associated with ajmaline are rare. A review of the literature yielded only one previous fatal case [*4*]. The case, a 56-year-old woman, died 2½ h after ingesting 2500 mg of ajmaline. The ajmaline concentration in blood was 10 μg/mL, liver 50 μg/g, and stomach contents 4700 μg/g. Two nonfatal cases who ingested 1050 and 2240 mg of ajmaline, respectively, revealed that the symptoms of intoxication were deep coma, hypotention, supraventricular tachycardia, and other arrhythmias [*1,5*].

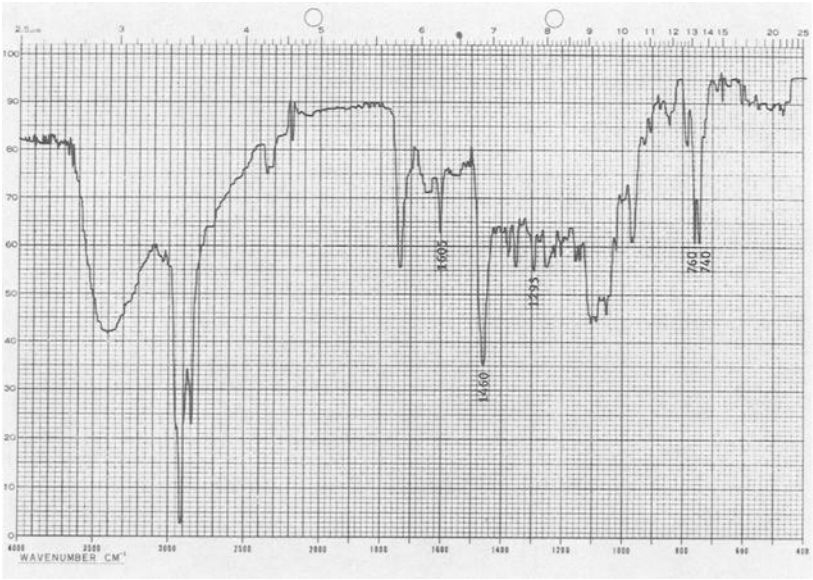


FIG. 2—*Infrared spectrum of the sample from blood. KBr micro tablet.*

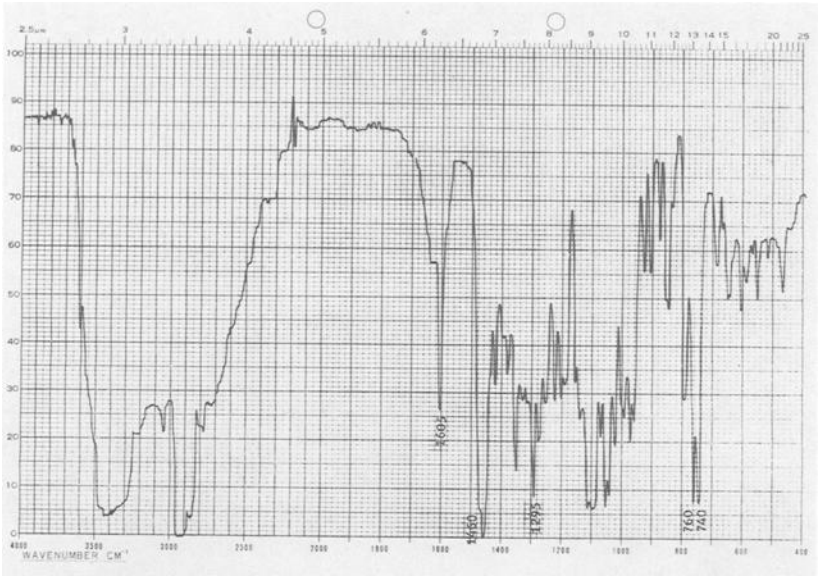

FIG. 3—*Infrared spectrum of the sample from standard of ajmaline. KBr micro tablet.*

## Conclusion

In our case, the decedent ingested 850 mg of ajmaline (53 mg per kilogram of body weight) which is 35 times the recommended therapeutic dose [*1,5*]. Based on investigation, medical history, autopsy, and toxicological findings, it was determined death was due to acute ajmaline intoxication.

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