Journal of Forensic Chemistry and Toxicology
Volume 2 Number 2, July - December 2016
DOI: http://dx.doi.org/10.21088/jfct.2454.9363.2216.3

Original Article

Detection and Identification of Xylocaine in Cadaver Material: A Case Study

Vinod Dhingra

Authors Affiliation: Senior Scientific Officer, State Forensic Science Laboratory, MPSH 15A, Gopal Ganj, Sagar, Madhya Pradesh 470003.

Reprints Requests: Vinod Dhingra, Senior Scientific Officer, State Forensic Science Laboratory, MPSH 15A, Gopal Ganj, Sagar, Madhya Pradesh 470003.

E-mail: vdhingraso@hotmail.com

Recived on 07.07.2016, **Accepted on** 23.07.2016

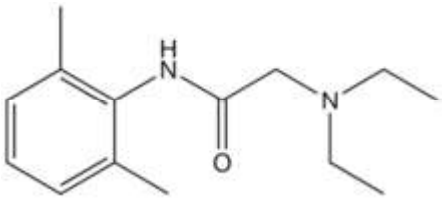
Abstract

Psychotropic substance like Xylocaine used as anesthetic substance in surgical operations were detected and identified in cadaver material of two deceased died during operation. The present work describes the detection and identification of Xylocaine in cadaver materials by chemical colour tests, thin layer chromatographic and U.V. spectroscopy.

Keywords: Lignocaine; Lidocaine; TLC; U.V.

Introduction

Xylocaine [1,2] is 2-Diethylaminoaceto-2'-6'-Xylidide used as local anesthetic which is long acting membrane stabilizing agent against ventricular arrhythmia having white to light yellow crystalline substance with molecular formula $C_{14}H_{22}N_2O$ the chemical structure of Xylocaine is



(I)

The present work describes the detection and identification of Xylocaine, in cadaver material by chemical colour test, thin layer chromatography and U.V. spectroscopy.

Case History

An old lady was admitted in hospital for eye operation on the day of operation doctor, before operation, gave her injection. The old lady immediately became unconscious and died. After thorough examination she was suspected to die due to drug reaction, which was given to her. Similarly in another case a person admitted to hospital for elbow surgery he also died due to an injection given before surgery.

The postmortem of the deceased was conducted and different autopsy material was sent to R.F.S.L. Gwalior for chemical analysis in order to establish the cause of death in these surgical procedures.

Material Received for Examination

1. Stomach, pieces of small intestine, liver, spleen, kidney, lung and brain.

2. Piece of skin and soft tissue from injection site.

Method of Isolation from Different Cadaver Material

Visceral tissues were subjected to standard Stas-Otto procedure of deproeination and acid as well alkaline; chloroform and ether (1:4) extracts were taken for analysis.

Pieces of skin, soft tissues from injection site were separately macerated and homogenized in 50ml absolute alcohol, each along with 1 ml of glacial acetic acid.

The tissues were refluxed over boiling water bath for about four hours. Filtrates were taken, evaporated and subjected to identification procedures for further examination.

Methods of Identification

All chemicals such as Benzene, Methanol, Ammonia, Bismuth sub nitrate, Potassium nitrate and Acetic acid were of analytical reagent grade. Distilled water was used throughout the study. Control drug sample Xylocaine were purchased from local medical shop.

Thin Layer Chromatographic Analysis

A standard glass TLC plates was coated with slurry of silica gel G in water to a uniform thickness of 0.25 mm. Heating in an oven at 110°C for about one hour activated the plate. An aliquots of standard Xylocaine and extract obtained from autopsy material were spotted on to the plate, which was developed with Cyclohexane: toluene: diethyl amine (75:15:10) in a pre saturated TLC chamber, to a height of 10 cm. The plate was removed from the chamber dried in air and sprayed by dragendroffs reagent at which gave orange coloured spots. The R*f* value of Xylocaine 0.35 can be compared with the obtained spots of visceral extract. The Rf value of Xylocaine in different solvent systems are given in following table

Colour Tests [3,4][4]

The extracted residue were dissolved in 2 ml alcohol 1 ml of each extract was taken for colour test.

S. No.	Solvent system	RF value
1.	Methanol/ strong Ammonia (100:1.5)	0.70
2.	Benzene/Acetone/ Methanol (80:10:10)	0.66
3.	Chloroform/Methanol (90:10)	0.73
4.	Chloroform/Acetone (90:10)	0.12
5.	Cyclohexane/Toluene/Diethylamine (75:15:10)	0.35

Observations

a. To an extracted residue, add 1 ml of dil nitric acid and 3 ml of mercuric nitrate solution and heat to boiling yellow green colour appears.

b. A conspicuous pink colour was observed in extractives from visceral material and skin piece when Marquise reagent (formaldehyde/ sulphuric acid) is added. This colour was well tallying with the colour given by control standard xylocaine using same spot test reagent.

UV Spectroscopy

The UV spectra were taken as Shimadzu UV spectrophotometer model 2550. The tissue and visceral extractives showed ë max in aqueous acid at 263nm and 272 nm tallied with the control sample.

Results and Discussions

The isolation and identification of drug by TLC technique, colour test and concordantly confirmed by U.V. spectral studies showed that drug were isolated.

TLC coupled with U.V. spectroscopy between 200nm to 400nm provided a reliable quick method of detection and identification of Xylocaine drug used as anesthetic agent which is evident from recorded observation a sharp λ max in aqueous acid at 263nm and 272 nm in skin as well as visceral extracts tallied with standard sample, concluded that Xylocaine drug would have been given by doctors to old lady and person underwent for surgery leading to the probable drug reaction fatality case by this local anesthetic.

Such rapid resolution by TLC, colour tests and

U.V. spectroscopy will undoubtly be of great value to the analytical toxicologist who may be confronted with the analysis of this drug in cadaver materials referred in emergency cases of fatal drug reaction.

Acknowledgement

Authors are grateful to Ex Joint Director, Mr. S. R. Patidar R.F.S.L. Gwalior and Director, FSL Sagar (M.P.) for providing necessary facilities and encouragement.

References

1. Mertha, W. "The Merck Index: An encyclopedia of chemical and drugs" Merck and Co. Inc., U.S.A., 1976; 334, 335, 941.
2. Stewart C.P. and Stolman A, Toxicology, Mechanism and analytical methods, Vol. II Academic presses, New York and London (1961).
3. Feigl F. spot tests in organic analysis, Elsvier Amsterdam London, New York, Princeton (1956).
4. Working procedure manual toxicology B.P. R & D Govt. of India New Delhi.