

CASE REPORT

John B. O'Toole III,¹ M.D.; Gordon B. Robbins,¹ M.D.; and Douglas S. Dixon,² M.D.

Ingestion of Isobutyl Nitrite, A Recreational Chemical of Abuse, Causing Fatal Methemoglobinemia

REFERENCE: O'Toole, J. B., Robbins, G. B., and Dixon, D. S., "Ingestion of Isobutyl Nitrite, A Recreational Chemical of Abuse, Causing Fatal Methemoglobinemia," *Journal of Forensic Sciences*, JFSCA, Vol. 32, No. 6, Nov. 1987, pp. 1811-1812.

ABSTRACT: Isobutyl nitrite is widely abused as a sexual stimulant and enhancer of discotheque dancing. Though the usual route of administration by inhalation has not resulted in any toxicologically verified deaths, there may be fatal toxic methemoglobinemia if the chemical is orally ingested. A second case of death following ingestion is discussed.

KEYWORDS: toxicology, isobutyl nitrite, death, drug abuse, accelerants

The first documented death related to ingestion of the popular recreational inhalant isobutyl nitrite was reported by one of the authors (DSD) after a young male ingested all or most of the contents of a brown glass bottle at a discotheque [1]. His symptomatology progressed from agitation, confusion, and combativeness to incoherence, intermittent lethargy, respiratory distress, and prostration. Despite oxygen and methylene blue therapy for presumed methemoglobinemia clinically diagnosed by recognition of the brown color of arterial blood, the patient died 2 h after onset of symptoms.

Autopsy revealed hyperemia and edema of lungs, edema of laryngeal tissues, petechiae of laryngeal mucosa, aromatic gastric contents, and acute hemorrhagic and ulcerative gastritis. The exposed heart and brain began to turn blue with the passage of time. Toxicology studies revealed a blood ethanol concentration of 0.02%, blood methemoglobin concentration of 38%, blood nitrite/nitrate concentration of 2.2 mg/dL, gastric nitrite/nitrate concentration of 90 mg/dL, gastric isobutanol concentration of 80 mg/dL, and blood methylene blue concentration of 0.06 mg/dL.

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¹Medical examiner of Bristol County, Massachusetts and pathologist for medical examiner of Bristol County, respectively, Commonwealth of Massachusetts, Office of the Medical Examiner, Boston, MA.

²Formerly, associate chief medical examiner, Commonwealth of Massachusetts, Office of the Medical Examiner, Boston, MA; currently, deputy medical examiner, Office of the Coroner, County of San Diego, CA.

Case Report

A 23-year-old black male purchased a bottle of isobutyl nitrite marketed as a "room odorizer" under one of the common tradenames, Rush®, in an urban area in the early afternoon. At 8:16 p.m., the man was arrested by police for violating a restraining order. He spent the night incarcerated. At 8:30 a.m. the next morning, he was taken to court handcuffed to another prisoner. At 9:00 a.m., the man allegedly inhaled isobutyl nitrite in a restroom. At 1:05 p.m., the deceased returned to the jail "fine and coherent." At 2:00 p.m., he left again for court, appearing "fine" to everyone. When he arrived at court at 2:40 p.m., he was "groggy and incoherent." He continued to deteriorate as he was taken to prison. He was redirected to a hospital where he arrived unconscious at 3:15 p.m. An emergency room physician noted an odor "like antifreeze." He died at 5:10 p.m.; the diagnosis of acute nitrite poisoning with methemoglobinemia was not entertained, and, therefore, no methylene blue was given.

An autopsy revealed marked pulmonary hyperemia with intra-alveolar hemorrhage, hyperemia of the liver, and diffuse mild gastric mucosal hyperemia. No blue discoloration of the tissues was noted. Toxicology studies revealed a blood ethanol concentration of 0.06%, blood methemoglobin concentration of 95%, blood carboxyhemoglobin concentration of less than 20%, blood cocaine concentration of 4 µg/dL (fluoridated specimen), positive urine cocaine screen, positive gastric isobutyl nitrite screen, and negative gastric isobutanol level.

Since there were no indicators of any intent to commit suicide on the part of the deceased, the manner of death was ruled "undetermined."

Discussion and Summary

The chemistry and pharmacology of nitrites, the toxicology of alkyl nitrites, the basics of methemoglobinemia, as well as susceptibility and therapy and the abused alkyl nitrite inhalants are discussed in detail in the previous case report [1]. Basically, the hemoglobin molecule is oxidized by the nitrite ion and becomes incapable of carrying oxygen, leading to a chemical asphyxia.

Because of the usage pattern of this chemical, any death in a young person (especially males), associated with presence at a discotheque or "dance club" or within the context of intercourse, must arouse the suspicion of nitrite poisoning from a form of alkyl nitrite inhalant. Any indication that the deceased possessed a "small brown glass bottle" should stimulate the same concern. Because the substances are so flammable, their role as an accelerant should be considered in any fire which appears to originate during sexual intercourse.

Reference

- [1] Dixon, D. S., Reisch, R. F., and Santinga, P. H., "Fatal Methemoglobinemia Resulting from Ingestion of Isobutyl Nitrite, a 'Room Odorizer' Widely Used for Recreational Purposes," *Journal of Forensic Sciences*, Vol. 26, No. 3, July 1981, pp. 587-593.

Address requests for reprints or additional information to
Douglas S. Dixon, M.D.
Office of the Coroner
County of San Diego
Bldg. 14
5555 Overland Ave.
San Diego, CA 92123