G118 An Unusual Case of Accidental Poisoning: Fatal Methadone Inhalation

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After attending this presentation attendees will gain insight on a case of unusual accidental poisoning with methadone, occurring in a 38- year-old man who inhaled a white powder bought on the black market.

This presentation will impact the forensic science community by presenting the dangers from using "home-made" drug preparations. To date and to our knowledge, no case of accidental death following methadone inhalation has been previously described up to the case herein presented.

Methadone hydrochloride (3-heptanone, 6-(dimethylamino)-4, 4- diphenyl-, hydrochloride) is a white, essentially odorless, bitter-tasting crystalline powder. It is very soluble in water.

It is a synthetic, long-lasting opioid with pharmacologic actions qualitatively similar to morphine and is active by oral and parenteral routes of administration. It is primarily used for relief of moderate to severe pain. It is also used in the detoxification and maintenance of patients who are dependent on opiates, particularly heroin. Recreationally, it is abused for its sedative and analgesic effects.

Methadone was synthesized by Ehrhart and Schaumann in Germany in 1941 in the Hoechst Laboratories and came into clinical use after the war. The use of methadone as a maintenance drug in heroin addicts began only in 1964, when Dr Vincent Dole and Dr. Marie Nyswander pioneered the use of a particular form of synthetic opiate for narcotic maintenance.

It is primarily a μ-receptor agonist and may mimic endogenous opioids and affect the release of other neurotransmitters (acetylcholine, norepinephrine, substance P and dopamine). This accounts for its analgesic and antitussive properties, respiratory depression, sedation, decrease in bowel motility, increase in biliary tone, hormone regulation and increase of prolactin and growth hormone release, miotic pupils, nausea, and hypotension.

As well as being an opioid receptor agonist, methadone acts as an antagonist at the N-methyl-D-aspartate (NMDA) receptor. The NMDA receptor system is a major excitatory central nervous system pathway involved in the neurobiology of pain. Methadone's ability to antagonize the NMDA receptor system may explain its superior analgesic behavior and why it can have effects in morphine resistant pain.

Unlike other opiates, methadone is primarily administered orally because of its good gastrointestinal absorption. It has high oral bioavailability and minimally lower rectal bioavailability. It is commercially available in liquid form. Most pharmacies, however, manufacture solutions, capsules or suppositories from less costly methadone powder.

Methadone hydrochloride powder is for oral administration only and is used in the preparation of a liquid by dissolving the powder in an appropriate vehicle. This preparation must not be injected.

The first fatality from methadone was recorded by Bieter and Hirsch (1948) in a 54-year-old man, who was given hypodermic injections of methadone (50 mg) in three doses over eight hours and who developed cyanosis and hypotension. They also recorded severe respiration depression in a 15-year-old boy who was given, by mistake, a 25 mg methadone hypodermic injection.

After inhaling methadone powder, he developed a cardiopulmonary arrest. Cardiac activity was restored only after prolonged resuscitative efforts. He was admitted to the local hospital and died after twenty-four hours of intensive care due to cardiac arrest.

An autopsy was performed at the University Center of Legal Medicine in Lausanne. At external examination there were only signs of medical treatment. Internal examination showed congestion of internal organs and cerebral and pulmonary edema. Histological examination showed moderate generalized congestion and hepatic steatosis.

Toxicological tests included blood ethanol levels and screening for common drugs and illegal substances by gas chromatography and mass spectrometry. This presentation will impact the forensic science community by showing the dangers of using "home-made" drug preparations. To date, case presentations of accidental death following methadone inhalation have not been previously described.

Conclusion: The cause of death was determined to be methadone intoxication, whose effects have been enhanced by the presence of ethanol.

Substance Abuse, Methadone, Intoxication

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