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Barbiturates

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Barbiturates are central nervous system depressants. They reduce the activity of the nervous system causing muscle relaxation and reductions in heart rate, breathing, and blood pressure. Although they were developed in the early 1900s and have been in use since then, during the 1960s and 1970s barbiturates surged in popularity for treatment of anxiety, insomnia and seizure disorders. Due to their sedative effect, they also became popular drugs of abuse. Barbiturates are on the Drug Enforcement Administration (DEA) schedules II, III, and IV depending on their mechanism of action.

As abuse of barbiturates increased during the 1960s, the danger of barbiturate addiction and overdose became widely known. Barbiturates have a very small therapeutic window, i.e. the effective dose is close to the dose that can cause death, particularly when combined with alcohol. For this reason, barbiturates have largely been replaced with benzodiazepines for therapeutic purposes. However, barbiturates remain readily available via internet purchase and there is some indication their recreational abuse is on the rise with teenagers. With the abuse of barbiturates, the intoxicated state can be manifested by some, or a combination of, the following signs (ref., 1, 2, 3,); Increased talkativeness, elation, reduced inhibitions, impaired judgment, emotional fluctuations, drowsiness or sedation, lack of clear speech, stumbling or unsteady gait, and confusion.

Regular therapeutic use of barbiturates can result in tolerance and dependence, requiring larger doses to reach a similar sedative effect. This is particularly dangerous in the case of barbiturates as there may be no corresponding increase in the lethal dose. Withdrawal from barbiturate addiction can cause agitation, tremors, tachycardia, delirium and hyperthermia. The withdrawal state for barbiturates is very similar to withdrawal state for ethanol. Patients with high-dosage addictions can even suffer seizures or in extreme cases, death.

The first barbiturate produced (Barbital, von Mering and Fischer, 1902) did not produce effects rapidly enough and its sedative effects lingered, so chemists began modifying the basic structure that classified barbiturates into ultrashort-, short-, intermediate- and long-acting categories. Phenobarbital, valued particularly for its anticonvulsant properties, was the second barbiturate to be developed in 1912.

Ultrashort-acting barbiturates (e.g. thiopental, thiamylal) are commonly used for anesthesia because their extremely short duration of action allows for greater control by the anesthesiologist. The middle two classes of barbiturates are often combined under the "short/intermediate-acting" category. These barbiturates (e.g. butabarbital, amobarbital) are also utilized for anesthetic purposes, and are sometimes prescribed for anxiety or insomnia. However, due to the dangers of long-term use of barbiturates, they are not commonly prescribed for insomnia. The final class of barbiturates is known as long-acting barbiturates (e.g. barbital and most notably phenobarbital, which has a half-life of roughly 92 hours). The long-acting barbiturates are used almost exclusively as anticonvulsants, although on rare occasions they are prescribed for daytime sedation.

The long-acting barbiturates have half-lives of one day or more, but the recreational effects of long-acting barbiturates may wear off faster than the drug can be eliminated. Repeated dosing to reach a desired effect may result in the accumulation of the drug in the body, which may approach toxic concentrations in the blood despite the user feeling little or no effects from the drug. Users who consume alcohol or other sedatives after the drug's effects have subsided, but before it has cleared the system, may experience a greatly exaggerated effect from the other sedatives which can be incapacitating or even fatal.

The laboratory determination of barbiturates is performed in a two-test process; immunoassay screening and then confirmation. The confirmation process must identify the exact analyte(s) of the barbiturates class, which is best done by isolation with chromatography and identification by mass spectrometry. All of the barbiturates are derivatives of a simple molecule, barbituric acid, however this is a very large family of molecules which are very different in biological activity. Current best practices for treatment would highly recommend that, before any action is taken with the patient, the exact barbiturate must be identified at the laboratory.

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References

1. Eddy, N. B., Halbach, H., Isbell, H., & Seevers, M. H. (1965). Drug dependence: its significance and characteristics. *Bulletin of the World Health Organization*, *32*(5), 721–733.

2. Doweiko, H. (2011). *Concepts of chemical dependency*. Belmont, CA: Nelson Education.

3. Maisto, S. A., Galizio, M., & Connors, G. J. (2014). *Drug use and abuse*. Stamford, CT: Cengage Learning.