

ToxTalks:

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A Bulletin for Healthcare Professionals Who Manage Poisoned Patients

Blue Ridge Poison Center

University of Virginia Health

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Phenethylamines



Image from <u>The National</u> <u>Library of Medicine</u>

What are phenethylamines?

Phenethylamines are a broad category of psychoactive and stimulant substances including amphetamines, MDMA, and other newer synthetic agents. Phenethylamines share a similar structure of a phenyl ring with a two-carbon side chain connecting an amine group. Substitutions along this ring are responsible for a broad range of clinical effects. Endogenously occurring phenethylamines include dopamine, tyrosine, and norepinephrine. Mescaline is a naturally occurring exogenous phenethylamine, which is found in the Peyote cactus.

Synthetic substituted phenethylamines may be manufactured in clandestine laboratories. While many have been regulated as Schedule I drugs, the synthesis of newer phenethylamines outpaces the ability to regulate them. These illicit substances are often marketed as "legal highs" or "legal ecstasy". Some of these include substances in the "2C" series.

2C Series

The 2C series phenethylamines, or "2Cs", are named based on the acronym for the two carbons between the amine group and the phenyl ring. Though this structure describes all drugs in the phenethylamine class, it has become shorthand for a group of substituted designer hallucinogens containing methyl groups at carbons 2 and 5 on the ring.

Pharmacology

Phenethylamines generally act as stimulants via stimulating release of dopamine, norepinephrine, and serotonin. The addition of the methyl groups in the 2Cs increases the hallucinatory effect, likely due to ability to bind to serotonin receptors, similar to MDMA. Onset of action depends on the method of use, as these can be

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Clinical Effects

As both a stimulant and serotonergic drug, designer phenethylamines, especially those of the 2C series, can demonstrate characteristics of sympathomimetic toxicity, serotonin toxicity, hallucinations, or a combination of all of the above. Patients may present with tachycardia, hyperthermia, agitation, or hallucinations. Mydriasis may be present. At large doses, seizures can occur.

Management

Diagnostic testing, notably the urine drug screen, has limited utility in managing phenethylamine intoxication. Many of the designer substituted phenethylamines may have positive amphetamine screens, but a negative screen does not rule out use. Urine drug screens also do not necessarily indicate acute intoxication and will rarely change management. There is no specific antidote for phenethylamines, and intoxication is treated supportively. Agitation, hallucinations, and seizures should be treated with benzodiazepines and antipsychotics can be added to treat hallucinations as needed. Patients with hyperthermia should be managed aggressively with benzodiazepines and cooling measures.

Summary

Designer substituted phenethylamines, such as the 2C series, are increasing in popularity as their creation is outpacing their regulation. They are sometimes marketed as "legal ecstasy", and in overdose can present with symptoms of hallucinations, sympathomimetic toxicity, and/or serotonin toxicity. Intoxication with these substances is primarily managed supportively, with emphasis on stabilization of airway, breathing, and circulation, as well as control of agitation, seizures, and hyperthermia.

References available upon request.







