New trends in drug abuse coming from USA.

Leda Kovatsi, Helen Tsoukali, Dimitrios Psaroulis

Laboratory of Forensic Medicine and Toxicology, School of Medicine, Aristotle University of Thessaloniki

ABSTRACT: In the present paper the current trends of drug abuse in the USA are presented. Some of them are expected to arrive in Europe, so it is necessary to be aware of them in order to recognize them and estimate their toxic effects. We present the major chemical groups, their use and abuse, the route of administration and their clinical effects.

Key Words: Drug abuse, Trends, USA.

INTRODUCTION

It is well known that the Internet allows rapid circulation of new drugs and novel methods of use. Studies have shown that users modify drug use based on information obtained from the internet. The information from innovative users can then be quickly distributed via e-mail, instant messaging and cell phones.

In the present paper we present the current trends of drug abuse in the US. Some of them are expected to arrive in Europe and it is necessary to be aware of them in order to recognize them, to estimate their possible effects and to treat abusers.

A) Abuse of prescription drugs

The abuse of prescription drugs is becoming more and more popular due to the easy access to them. Actually, cannabis is the only drug abused more frequently than prescription drugs and although the rate of illicit drug use among adolescents is declining, the rate of prescription drug abuse is increasing.

The most common prescription drugs abused in the US are the opioid analgesics and dextromethorphan, although another very popular trend is the abuse of mixtures of prescription drugs which makes diagnosis and treatment very difficult.

1) Opioid Analgesics

Opioid analgesics are among the most commonly abused prescription drugs. In the US a prescription drug containing oxycodone1 together with acetaminophen has become very popular and its abuse has increased by almost 40% between 2002-2005.

Opioid analgesics are usually ingested. Nevertheless, crushed tablets can be injected intravenously or can be intranasally insufflated.

Another substance becoming more and more popular is fentanyl2. Fentanyl has 50-100x the potency of morphine and the patches contain significant amounts of it even after a typical 3 day application. Fentanyl is usually prescribed as a strong pain reliever in cancer patients.

Fentanyl is usually abused by:
- Placing multiple patches on skin for dermal absorption
- Ingesting and chewing the patch to disrupt the depot reservoir
- Boiling patches to make fentanyl tea
- Contaminating heroin. The produced mix has a higher potency than heroin alone and can be responsible for periodic death epidemics in opioid users.

Clinical Effects

The abuse of opioid analgesics has the following clinical manifestations:

a) Opioid Toxidrome (Toxic Syndrome) which includes meiosis, mental status and respiratory depression and decreased bowel motility.

b) Histamine release from anaphylactoid reaction.

Corresponding author: Leda Kovatsi, Laboratory of Forensic Medicine and Toxicology, School of Medicine, Tel.: 2310 999222, e-mail: kovatsi@med.auth.gr
c) Acute lung injury.
d) Development of tolerance to euphoria and mental status depression but not to respiratory depressant effects.

2) Dextromethorphan

Dextromethorphan (DXM or DM) is an antitussive (cough suppressant) drug found in many over-the-counter cold and cough medicines. Pure dextromethorphan occurs as a powder made up of white crystals, but it is generally administered via syrups, tablets, or lozenges manufactured under several different brand names and generic labels.

When taken at doses higher than are medically recommended, dextromethorphan acts as a dissociative hallucinogenic drug. It is classified neurochemically as an NMDA receptor antagonist. Its effects are similar to those of the controlled substances ketamine and phencyclidine (PCP) and therefore it has a significant potential for abuse.

Dextromethorphan is often abused by adolescents. Its «street names» are Robo, Dex, DXM, Triple C and Skittles. It is typically ingested although another popular practice is the so called «Freebasing» which is a lemon extraction method leading to pure dextromethorphan without additives.

Clinical effects
The abuse of dextromethorphan has the following clinical manifestations:

a) Euphoria, dysphoria, dissociative phenomenon, somnolence, hallucinations, ataxia, slurred speech, tachycardia, hypertension, diaphoresis, and rotary nystagmus.
b) Patients taking cough and cold preparations are at risk for poisoning from other medications such as acetaminophen, pseudoephedrine, antihistamines and bromide.

B) Novel practices of abuse-Pharming

The term «Pharming» is used to describe a special prescription drug abuse setting. Adolescents take medications from their homes and bring them to parties where they are mixed together in bowls. The medications are passed around and ingested and this multidrug ingestion of what may be unknown substances can make diagnosis and treatment more difficult.

C) Cheese

Cheese gained national attention in the US in 2005 when it was linked to the deaths of several Dallas teenagers. It targets adolescents and is called «starter heroin». It is a mixture of heroin with cold and cough preparations. In this mixture the heroin content is typically lower than in other types of heroin. This is usually insufflated and not injected.

Clinical findings
Cheese has the following clinical manifestations:

a) Opioid toxidrome
b) Other findings, related to the nature of the coingestants. For example diphenhydramine causes the anticholinergic toxidrome (blurred vision, choreoathetosis, coma, decreased bowel sounds, delirium, dry skin, fever, flushing, hallucinations, ileus, memory loss, mydriasis, myoclonus, psychosis, seizures, and urinary retention).

D) Phenylethylamines

They are amphetamine derivatives either naturally occurring (mesaline) or synthetic, known as «designer drugs». There are hundreds of derivatives, but the most common examples are:

- methylenedioxymethamphetamine (MDMA-Ecstasy)
- 4-bromo-2,5-dimethoxyphenethylamine (2C-B)
- 2,5-dimethoxy-4-ethylthiophenylethylamine (2C-T-2)
- 1-(8-bromobenzo[1,2-b;4,5-b']difuran-4-yl) -2-aminopropane (Bromofly, Bromodragonfly).

All of these substances have an amphetamine-like structure with substitutions that enhance their ability to affect serotonin release. Many of these compounds are also structurally similar to serotonin and bind to the SHT2 receptor.

The phenylethylamines are widely abused in Europe and are included in the list of abused substances issued by the European Monitoring Centre for Drugs and Drug Addiction.

Clinical Effects
The abuse of phenylethylamines has the following clinical manifestations:

a) Amphetamine-like effects (headache, hypertension, tachycardia, agitation, seizures).
b) Serotonergic effects (euphoria, hallucination, nausea and vomiting).

c) Deaths reported often from hyperthermia.

E) Cathinone and Metcathinone (Cat, Khat, Jeff)

Cathinone (benzylketoamphetamine) is naturally contained in leaves of Catha edulis, a plant used in East Africa and the Arabic peninsula, particularly in social ceremonies such as weddings. It is also known as quat and gat and is reported to be an increasingly common drug intercepted by US Customs and the DEA. It is imported as the fresh plant, gathered in bundles and must be consumed within a few days of harvest. It is either chewed or brewed into tea.

According to previous work of our laboratory, cathinone and metcathinone have already appeared in the European and Hellenic market and are gaining great popularity.

Clinical effects

The abuse of cathinone has the following clinical manifestations:

a) Increased alertness, euphoria, insomnia, anxiety and hyperactivity.

b) Increased consumption linked to psychosis.

Metcathinone is a similar synthetic amphetamine, synthesized and used in Russia since the 1970s. It is the main drug of abuse in Russia, exceeding cocaine. It is called Cat and Jeff.

Clinical effects

The abuse of metcathinone has clinical manifestations similar to methamphetamine:

Psychomotor agitation, anorexia, hallucinations.

F) Ketamine

Ketamine is known as «special K», «K», «Vitamin K», «Fort Dodge». It is a dissociate anesthetic marketed in 1970 as a phencyclidine (PCP) alternative. It was first used in veterinary medicine and until today ketamine from the street is often a diverted veterinary preparation.

It is very popular in clubs for its out of body experience, its low price and its short duration of action.

The solvent is usually evaporated leaving white crystalline material which is used by insufflation or ingestion. Low doses (Insufflation 30-75 mg, Ingestion 75-300 mg) lead to sedation while higher doses (Insufflation 100-250 mg, Ingestion 300-450 mg) result in more severe CNS toxicity.

Tablets of ketamine often contain other substances such as cocaine (CK=cocaine + ketamine), caffeine, MDMA, ephedrine, methamphetamine and heroin.

According to previous work of our laboratory, ketamine has already appeared in the European and Hellenic market.

Clinical Effects

The clinical effects occur in minutes and last 30-90 minutes. The presentation varies, according to the dose, the route of administration, the contaminants and the tolerance. Its effects include:

a) Mild sympathomimetic effects - hypertension and tachycardia.

b) Variable CNS effects.

- Maybe be calm, sedated or comatose.
- Out of body sensations.
- «K-hole». Adverse reaction which includes dysphoria, severe hallucination, vomiting, and catatonia, and lasts minutes to hours.
- Maybe have psychomotor agitation.
- Psychosis can occur.
- Severe emergence reactions.
- Classically associated with rotary nystagmus, also ataxia and gait disturbances.

G) Salvia divinorum (Divine Mint)

It is a herb classified as a member of the Mint family. It is also called «La Pastora» «Yerba Maria», «Diviner’s Mint», «Diviner’s Sage». It is used for medicinal and spiritual purposes by the Mazatec Indians in Mexico and it is available in a variety of stores, «head shops» and online. The Internet has played a large role in the expansion of this substance since it is advertised as a hallucinogen that cannot be detected on a drug screen.

The plant has many different compounds. The active ingredient is probably salvinorin A, which is a hallucinogen. The plant can be smoked or chewed. Smoking has an immediate onset of hallucinations, but a shorter duration. Chewing has a slower onset of hallucinations but duration is longer than with smoking.

Clinical Effects

The abuse of salvia divinorum has the following clinical manifestations:
a) Euphoria, out of body experiences, hallucinations, uncontrolled laughter, synesthesia

b) One death associated with use though role of Salvia is controversial.

The duration of action is short, lasting between 30 minutes and 2 hours.

The above presented information reflects the current trends in drug abuse in the US. These trends involve either new substances being abused or novel practices of abuse of already known substances.

As mentioned before, some of these trends are expected to arrive in Europe, as has already happened with the phenylethylamines, ketamine and Khat. On the other hand, other trends will never reach our continent.

Clinical toxicologists must be aware of these trends in order to be able to recognize them and treat them as effectively as possible.

REFERENCES