New Psychotropic Substances.

Foteini Valtadorou¹, Stavros Dimitriadis¹, Nicholaos Raikos²,
Heleni Tsoukali-Papadopoulou³

¹Medical Students A.U.Th. (equivalent participation)
²Assistant Professor of Toxicology
³Professor of Toxicology

Department of Forensic Medicine and Toxicology, Aristotle University of Thessaloniki, Greece

ABSTRACT: The social origin of the addicted people has altered during time. In the past, people who used psychotropic substances were from specific social matrices, but nowadays they are from every layer of the society. A second characteristic is the distribution in the «black» market of new synthetic «drugs», often, very dangerous for the health of the users, beside of the known, natural or semi-synthetic substances (the traditional «drugs»). Finally, it has to be mentioned that the traditional «drugs» are used with new ways and many times in compounds with difficulty or impossibly predictable effects.

As new synthetic «drugs» are considered the psychotropic substances with limited therapeutic value, which are not enlisted in one of the categories of the treaty of U.N. in 1971 for the psychotropic substances and which potentially, can be tortuous for Public Health and for social mass. Some of these substances have already been under control in European level and the most characteristic belong to the following categories: a) amphetamine-like stimulants (4-MTA, MBDB, PMMA, PMA, etc), b) synthetic tryptamins (5Meo-DMT, DPT etc), c) ketamine, d) GHB and finally, e) the natural «drug» Khat.

The purpose of this paper is the presentation of the new psychotropic substances that are distributed in European and Hellenic market and the demonstration of the characteristics and the jeopardy their use hides.

Key Words: New psychotropic substances, New synthetic drugs, Amphetamine-like stimulants, Synthetic tryptamines, Ketamine, GHB, Khat.

INTRODUCTION

New synthetic drugs are considered as the psychotropic substances, with limited therapeutic value, which are not enlisted in one of the categories of the treaty of U.N. in 1971 for psychotropic substances and can potentially be tortuous for Public Health. Since 2000, 68 new substances have been reported at the European Monitoring Center for Drugs and Drug Addiction.

The new synthetic drugs present some special features, which demand proper scientific management:

1. Usually, they are produced from precursor substances that are easily available.
2. Usually, they are distributed to the users as «ecstasy» pills.
3. The pills differ significantly in their texture. The combination of the substances varies unpredictably in action and toxicity.
4. Small modification of the chemical structure changes significantly their pharmacological and toxicological status.
5. Often, they have a «special» pharmacological action, which can not be easily studied and classified in the known categories.

The newer drugs are:

A) Amphetamine-like stimulants (methamphetamine, MDMA, PMA, 4-MTA),
B) Synthetic tryptamine,
C) Ketamine,
D) GHB,
E) Khat (the natural «drug»)

A. Amphetamine-like stimulants

The molecule of amphetamine consists of one annulus, one pleural chain and some chemical groups
Other chemical groups can be connected on the annulus and the pleural chain. It has as a result, the ability of having new psychotropic substances, which resemble structurally to amphetamine, but differ in some degree. These are called amphetamine-like stimulants and their action is less or more stimulant in comparison to amphetamine. Moreover, their action can be hallucinatory, psychedelic or a combination of all the previous actions. Amphetamine is not used in the laboratory for the preparation of these «drugs», but other chemical substances (precursors) are used, depending on the kind of the «drug» prepared.

The drug users call all the substances of this category «Ecstasy», independently from their synthesis. Thus, a user does not know which substance is included in the pill and in what quantity. This is a serious reason, which makes them very dangerous. On the other side, the «ecstasy» pills are widespread, due to their form, their convenience to use, their low price and their easiness to be produced.

General consequences from the use of amphetamine-like stimulants:

1) Psychological disturbances: In normal dosages they produce increase of alertness, stimulation, communicativeness, reduction of appetite, fatigue and clarity of thought. In higher dosages they produce hyperexcitability, aggressiveness, anxiety, suspiciousness, hallucinations, many times paranoiac phenomena and psychotic reactions.

2) Toxic disturbances: The most serious is hyperthermia. Others are depression, mental confusion, mental fatigue, paroxysms, physical exhaustion, mental disturbances, weight loss, kidney failure, reduced perception and judge, paranoia and some times psychosis. Moreover, in some case reports deaths have been reported.

Methampetamine: It is known among the users under the code names «speed», «ice», «crystal», «crank», «glass». It is highly addictive stimulant drug, which has great perspective for widespread abuse; because it is cheap, available in a lot of different forms (Figure 2) and is the most widespread club drug worldwide. Also, it can be easily produced in secret laboratories from cheap, legal substances.

MDMA: Only this was called «ecstasy» during the past (Figure 3). It is hallucinatory, stimulant, synthetic, psychoactive drug with chemical structure similar to methamphetamine and mescaline.

PMA: Some deaths have been reported in Australia. It is stimulant and hallucinatory as MDMA with the combination of the danger of hyperthermia and hyperpyrexia.

4-MTA: It is usually, sold with the names «Flatliners», «S-5», «MK» as ecstasy in tablets, pills, which contain 100-140 mg of the substance. Even though
there are no systemic researches for its effects on human, unedited evidence suggest that the danger of side effects is increasing from the characteristic slow appearance of the effects (>1h) in comparison to MDMA and from the fact that it is likely that the users receive over 1 pill, mistakenly believing that the first pill was bad quality or with low dosage. Therefore, the ventrurousness of this substance is due to the slow start of the symptoms, but also due to the longer last of its effect.

It is a psychoactive amphetamine sulfate analog that causes abrupt release of serotonin (5-HT) and inhibition of the function of MAO. This combination of actions is responsible for the syndrome of Serotonin (Hyperserotoninic stage). Other symptoms that have been reported are: nausea, nystagmous, hyperthermia, thirst, tremor, confusion, memory loss, ephedrosis, respiratory depression and intoxication. Its combination with other substances like MDMA, amphetamines, alcohol and ephedrine derivatives may increase the danger for serious problems related to the use. A great percentage of the users were not satisfied from the results because of its use. Therefore, it looks like that it has been withdrawn from the market.

B. Synthetic Tryptamines
They are also synthetic hallucinogens, which have similar structure to the already known tryptamin. They are easily produced in the laboratory with simple chemical methods. That is why new substances of this type are added from time to time in the control boards.

Some of them are: 5Meo-DMT, 5Meo-DIPT, DPT, A-MT.

They usually are inhaled or smoked and some of their names at the illegal market are: «Foxy», «Foxy-Methoxy» (5Meo-DIPT), «The Light» (DPT).

C. Ketamine
The common names of this substance are «K», «special K», «super K» etc. The forms in which ketamine can be found are liquid, pills or dust and is used orally, nasally or intramuscularly (Figure 4). It is also a well known medicine which is used as an anesthetic in veterinary.

It is a short term anesthetic with psychomimetic parameters (analgesia and appeasement), anesthetic antagonist like GHB and has similar action to phenycyclidine («angeldust»). It is an antagonist of NMDA receptors that are in abundance in the brain and play a significant role in memory and thus provokes neurotoxical lesions. There has been reported total memory impairment that is sustained 3 days after the use of ketamine in chronic users. In small dosages it can cause euphoria, relaxation and hallucination, a phenomenon that the users call «K-land». In higher dosages the substance induces something like a death experience and disjunction from the body and the users call it «K-hole». It, also, causes elimination of pain, tolerance and addiction and may lead to schizophrenia. Specifically, in one dosage it causes shortly reversible symptoms alike to schizophrenia in healthy volunteers. The toxic outcomes of the substance are tachycardia, hallucinations, anxiety, chest pain, emotion, delirium and insomnia.

D. GHB
It is a substance that has recently appeared in illicit market with the code names «liquid ecstasy», «liquid X», «soap», «cherry meth», «easy lay», «liquid-e» etc. At first was sold as a dietary supplement and later was promoted in the Internet as a safe muscle augmentative. It was used as a tranquilizer, against narcolepsy, in tachycardia, against alcoholism, against insomnia and for weight control.

Its widespread use was even more increased when it started being used as a club drug. It is distributed in liquid form and rare as a dust (Figure 5). The users often mix GHB with other drinks. In small quantities it acts as a relaxant, but in large quantities it can cause difficulty in breathing and may result in coma. It is also called «rape drug», because it reduces the resistances, causes amnesia and it has been related with sexual assaults which were facilitated by drugs. There is also a significant correlation between use of GHB and sexually deviated behaviours.

E. Khat
It is an indedicious plant that flourishes in high altitudes in East Africa and Arabian Peninsula (Figure 6). The chewing of the fresh leaves of the khat is a widespread habit in the local populations. This plant-«drug» was imported to the western countries by the immigrants and its consume has started at the western world in the last few years. The ways of consume are by chewing fresh leaves, by smoking its dehydrated smoke, or by drinking it as a decoction.

Most of its results are still unknown and there is no experience in valuation of the symptoms, because
of the khat alkaloids. It is considered to be more addictive from amphetamines. The natural psychoactive substances of khat (khat-alkaloids) are cathinone (which is the most active), cathine and norephedrine. The clinical effects that have been reported after the use of khat are divided into a stimulation and a depressive phase. The khat-alkaloids have shown that they behave like amphetamines with a) effect on the autonomous nervous system and b) natural symptoms (after-effects)\(^6,7,8\) (Figure 7).

The intoxication is difficult to be diagnosed and treated correctly because of 2 reasons:
- The intoxication from synthetic or natural cathinone derivatives cause misleading symptoms.
- The consumers-targets of the western society are usually educated. They are aware of the jeopardy and the precautionary meters.

Thus, there have been reported cases where the intoxication was camouflaged by the simultaneous intake of benzodiazepines and alcohol.\(^8\)
Νέες ναρκωτικές ουσίες.

Βαλταδώρου Φωτεινή1, Δημητριάδης Σταύρος1, Ράικος Νικόλαος2, Τσούκαλη Ελένη3

1Φοιτητές Ιατρικής (ισότιμη συμμετοχή),
2Επίκουρος Καθηγητής Τοξικολογίας,
3Καθηγήτρια Τοξικολογίας

Εργαστήριο Ιατροδικαστικής και Τοξικολογίας, Ιατρική Σχολή, Α.Π.Θ.

ΠΕΡΙΛΗΨΗ: Η κοινωνική προέλευση των εξαρτημένων διαφοροποίηθηκε στην πορεία του χρόνου. Παλιότερα τα άτομα που έκαναν χρήση ουσιών προέρχονταν από συγκεκριμένα περιβάλλοντα, ενώ σήμερα από όλο τον πληθυσμό. Επίσης, ένα δεύτερο χαρακτηριστικό είναι η κυκλοφορία στην παράνομη αγορά νέων συνθετικών ναρκωτικών, συχνά πολύ επικίνδυνων για την υγεία των χρηστών, εκτός των γνωστών, φυσικών και ημισυνθετικών ουσιών (παραδοσιακά ναρκωτικά). Τέλος, θα πρέπει να αναφερθεί ότι τα παραδοσιακά ναρκωτικά, χρησιμοποιούνται με νέους τρόπους και πολλές φορές σε μίγματα με δράσεις που είναι δύσκολο ή και αδύνατο να προβλεφθούν.

Ως νέα συνθετικά ναρκωτικά θεωρούνται οι ψυχοδραστικές ουσίες με περιορισμένη θεραπευτική αξία, οι οποίες δεν περιλαμβάνονται σε κάποια από τις κατηγορίες της σύμβασης του Ο.Η.Ε. του 1971 για τις ψυχοτρόπες ουσίες και οι οποίες δυνητικά εγκυμονούν κινδύνους για τη Δημόσια Υγεία και το κοινωνικό σύνολο. Ορισμένες από τις ουσίες αυτές έχουν ήδη μετα επίγειου επίπεδου και οι χαρακτηριστικά τους ανήκουν στις παρακάτω κατηγορίες: α) διεγερτικά τύπου αμφεταμίνης (4-ΜΤΑ, MBDB, PMMA, PMA, κτλ), β) συνθετικές τρυπταμίνες (5Meo-DMT, DPT κτλ), γ) κεταμίνη, δ) GHB και τέλος, ε) το φυσικό “ναρκοτικό” Khat.

Σκοπός της εργασίας αυτής είναι η παρουσίαση των νέων ναρκωτικών που κυκλοφορούν στην ευρωπαϊκή και ελληνική αγορά και η κατάδειξη των χαρακτηριστικών και των κινδύνων που ενέχει η χρήση τους.

Λέξεις Κλειδιά: Νέα συνθετικά ναρκωτικά, Διεγερτικά τύπου αμφεταμίνης, Συνθετικές τρυπταμίνες, Κεταμίνη, GHB, Khat.

REFERENCES

1. Wu LT, Schlenger WE, Galvin DM. Concurrent use of methamphetamine, MDMA, LSD, ketamine, GHB, and flunitrazepam among American youths. Drug and Alcohol Dependence 2006; 84 (1): 102-113
9. www.erowid.org