

The Psychotomimetic Amphetamines with Special Reference to DOM (STP) Toxicity

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The "psychotomimetic amphetamines"¹ refer to a group of psychoactive drugs which include MDA, MDMA, and DOM. This latter compound, 2,5-dimethoxy-4-methyl-amphetamine (see figure 1), gained transient popularity and a national reputation in 1967 when it was introduced into the Haight-Ashbury district of San Francisco under the street name of STP.

When initially introduced in large quantity in June of 1967, neither the population at risk nor the scientific community was aware of the exact nature of the drug.² However, the Haight-Ashbury Community at that time contained a large, mobile group of youngsters between the ages of 16 and 25 whose motto was "to try everything one time." Thousands of STP tablets³ (whose true identity was unknown to the user) were consumed in a relatively short period. As a consequence a large number of acute and chronic toxic STP reactions were seen both at the Haight-Ashbury Free Medical Clinic and at San Francisco General Hospital. Information defining the dangers of STP were rapidly distributed by the Haight-Ashbury Clinic and by the mass underground media and as a result the number of STP ingestions and toxic reactions were reduced greatly. However, STP has continued to appear in San Francisco since that time in other preparations (such as the wedge⁴ series) which disguise the true nature of the drug. The most dramatic of these recurrent marketing patterns occurred in November of 1967 with the "pink wedge episode."⁴ This

preparation contained 270 mcg. of LSD and 970 mcg. of STP. The population at risk heard it was "good acid" and approximately 5,000 "pink wedges" were consumed on the 10th and 11th of that month. As a result a large number of acute toxic psychoses were seen both at the Haight-Ashbury Clinic and at San Francisco General Hospital. Since that time STP in various dosages has continued to appear intermittently in such preparations as the white wedge, the yellow wedge, the purple wedge, and the red barrel.

The purpose of this paper is to define the various patterns of STP toxicity and to make diagnostic and treatment recommendations based on two years of clinical experience with the drug. This toxicological presentation will be derived from analysis of approximately 100 cases of STP toxicity and from a collective observation and study³ of a large number of young people actively engaged in the use of illegal drugs. The vicissitudes of the population and the reasons for their susceptibility to uncontrolled STP experimentation have been adequately described by Meyers *et al.* and Shick *et al.* This paper will focus only on specific reactions and will present individual cases to illustrate each of these toxic manifestations with the objective of providing guidelines for the clinician or other health professional who might be involved with patients having problems with STP.

THE STP REACTION

The psychological effects of STP are similar to LSD⁵ with significant alteration in perceptual functioning producing vivid, colored imagery and impairment of cogni-

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tive functioning or reality testing. At the dose ingested on the street (10 mg., or three to four times the laboratory dose⁶ which has been studied) the peak of these psychological changes often last 16 to 24 hours which is significantly longer than the 8 to 10 hour LSD experience. This longer duration of drug action contributes substantially to the higher incidence of acute panic reactions seen with STP.

In addition, the physiological effects of STP are much more intense than with LSD. The patient has a rapid heart rate, widely dilated pupils with photophobia and an extremely dry mouth. A somewhat similar intoxication picture can be seen with belladonna intoxication and as a result, before the chemical nature of STP was established as a "psychotomimetic amphetamine," it was suspected that this drug might be an atropine-like substance. As a result treatment with the phenothiazines was avoided because of the atropine-like side effects of this therapeutic drug group. Although this therapeutic contraindication was eliminated with accurate identification of the drug, it still appears that the phenothiazines prolong the disability of the patient under the influence of STP despite the fact that this observation has not been substantiated in the laboratory.⁶

ACUTE STP TOXICITY

Because of the intense physiological and psychological effects of STP, there appears to be a higher incidence of acute panic reactions associated with the drug experience than with other psychotomimetic drugs including LSD. This increased incidence, appears to be related to the duration of the reaction (e.g., the patient feels the reactions will never end and he is going "crazy"), also the intensity of the amphetamine-like peripheral effects, and misinterpretation of psycho-physiological effects (e.g., the patient feels his rapid heartbeat and shortness of breath are a heart attack).

As pointed out by Meyers *et al.*, the more experienced the user and his companions are with psychedelic drugs, the less likely he is to experience a bad drug reaction or to require professional help. However, previous drug experience does not preclude an adverse reaction. Further, maintenance of a supportive, non-threatening environment and communication with an individual the patient feels comfortable with, can greatly reduce the adverse effects associated with the bad STP experience. The crucial nature of these two therapeutic variables were adequately demonstrated at the Haight-Ashbury Clinic on July 3rd of 1967. The use of STP was at its peak in the Haight-Ashbury, but identification of the drug or proper antagonist had not been established. At this time the author was reluctant to use any specific

drug treatment and the Clinic was focusing on the "talk down approach" in the H.A.C. calm center.⁷ The following case example demonstrates these variables.

Case 1.—Three young Caucasian males came to the Haight-Ashbury Clinic in an acutely agitated state after the ingestion of STP. All three had previous drug experience with LSD and other psychedelics, but reported this to be their first STP experience. All three had widely dilated pupils, rapid heart rate, dry mouth and fine motor tremor. They were actively hallucinating and felt in danger of going "crazy" because the trip seemed like it would never end. One boy had a short break with reality and began screaming, and it appeared all three might have to be restrained and hospitalized. A familiar Haight-Ashbury figure named "Swami" or "Super-Guru" asked the author for permission to work with the patients in the Calm Center. After several hours of mystical discussion about peace, love and energy with the patients in a semi-circular setting around a candle with "Super-Guru" as the guide, the patients left the Clinic in good condition. No medication was given, hospitalization was not required, and the utilization of physicians was limited to checking the group at intervals. Follow-up indicated that the patients' only complaint was feeling slightly "high" for one week.

Subsequent experience with STP intoxication has indicated that sedation should be added to the treatment regimen (in addition to the variables described above) particularly when the patient loses contact with reality as demonstrated in the following case.

Case 2.—A 25-year-old male was found by police running nude through Golden Gate Park, and brought to San Francisco General Hospital. He had been in and out of mental hospitals all his life and had a history of chronic drug abuse. His friends reported that he had taken two half-tablets of STP (green wedges), one orally and one intravenously. His arm had green coloring around the injection site. Upon admission he was paranoid, delusional, hallucinating and anxious. He claimed that a friend of his was "murdered by the Mafia" just after he took the drug, and that this is what upset him. He said that he was aware that he would be taken to the hospital if he removed his clothes in the park and that he wished to go to the hospital. On the ward he was given 50 mg. of Librium® intramuscularly and 500 mg. of chloral hydrate every 2 hours for agitation. After 24 hours, he appeared calm and appropriate, and was discharged. Just before his discharge he commented that his STP experience was a "good trip." Follow-up indicated that the patient continued a life style of aberrant behavior and chronic drug use.

Clinical experience has also indicated that certain

techniques can markedly aggravate the STP intoxication. Aggressive police restraint or placing the patient in jail overnight can accentuate the severity of the STP panic reaction. In addition, for reasons not understood by the author, administration of high doses of phenothiazines during the STP reaction seem to prolong the period of disability as demonstrated in the following case.

Case 3.—A 20-year-old male was brought from jail to San Francisco General Hospital. He had taken STP 24 hours earlier and was hyperactive, confused, agitated, disorganized and hostile. He was hallucinating and laughing without appropriate cause. His speech was irrelevant and incoherent as he threatened to bang his head through the wall. He was given 100 mg. of chlorpromazine intramuscularly and placed in restraints. His symptoms increased and his dosage of chlorpromazine was increased to 200 mg. i.m. or orally every 4 hours without improvement. Stelazine® was added to the regimen again with no apparent improvement. At the end of 72 hours, the phenothiazines were stopped and the patient gradually became more lucid and coherent over the following 24 hours. However he remained on the ward for five more days because of recurrence of the bad STP experience without further ingestion of the drug, thus seriously impairing his ability to function. During this later period the patient was given only Librium® for sedation and chloral hydrate for sleep. At the end of this period he went AWOL from the ward and no follow up was obtained.

SUBACUTE STP TOXICITY

The recurrence of drug experiences without further ingestion of the drug (the "flashback") is a well known phenomena with LSD although the mechanism has not been established.⁸ This same phenomena has been reported with other psychoactive drugs such as marijuana.⁹

With STP, however, there seems to be an unusually high incidence of recurrent reactions and delayed prolonged reactions particularly when high doses of phenothiazines have been used in treating the bad STP trip.

As noted by Meyers *et al.* these delayed reactions following STP ingestion are most disabling. One patient in our series became acutely disoriented and belligerent following STP ingestion and ended up in the city prison. The symptoms remitted while in prison but 11 days later he became incoherent with active auditory and visual hallucinations requiring hospitalization. He left the hospital AWOL but two months later was admitted with recurrent hallucinations, psychotic depression and suicidal thoughts. The patient stated that he never recovered from his bad STP trip. The examining psychiatrist, however, felt the patient had a long history of

psychiatric problems prior to the STP experience and felt that the drug merely served as a trigger in a susceptible patient. At present it is difficult to postulate as to the exact mechanism of the recurrent or delayed reaction following STP ingestion and the role played by the personality variable. However, one recurrent depersonalization experience, seen at the Haight-Ashbury Clinic, appeared 6 months after the ingestion of STP in a patient who had no previous history of significant psychopathology.

Case 4.—A 23-year-old obese white male came to the Haight-Ashbury Clinic complaining of recurrent creeping loss of body sensation that was quite alarming to him. He had taken STP previously about 6 months prior to the onset of these disturbing feelings. The duration and intensity of the drug experience had proven quite frightening to him and he had a panic reaction. He recovered with no apparent residual effects. The drug experience was so disturbing, however, that he decided to cease all drug usage for at least an experimental period of time. Six months later he started to feel a tingling sensation in the bottom of his feet which crept up until he began feeling a loss of sensation in his scrotum. He then began to have very intense feelings of depersonalization, similar to his STP experience with loss of body image to the point where he sought medical help at the Haight-Ashbury Clinic Psychiatric Annex. Sedative medication and long-term supportive psychotherapy produced gradual resolution of these feelings of depersonalization, although they tended to recur at irregular intervals for 8 months.

It appears then that STP produces a higher incidence of acute and chronic toxic reactions than any of the other commonly used hallucinogens. It is impossible, however, to state what percentage of those who ingest STP actually develop some difficulty because many of the adverse reactions are handled by the community and are not brought to the attention of the medical community or the mechanism of this enhanced toxicity. It is difficult to pinpoint the exact reasons for this increased incidence of toxic reactions with STP. It appears that the effects of STP are like a combination of amphetamine and LSD with the hallucinogenic effects of the drug very often putting the peripheral amphetamine-like physiological effects out of perspective, with subsequent interpretation of these effects as life threatening as demonstrated by the following case.

Case 5.—A 23-year-old white female came to the Haight-Ashbury Clinic in an acutely panic stricken state. She had taken STP approximately 8 hours previous and was having a good experience with heavy hallucinations but the rapid heart rate and palpitations that she was

having persisted to the point where she felt she was having a heart attack, and she came to the Clinic for treatment of this condition.

DISCUSSION

The mechanism for this enhanced STP toxicity is poorly understood. In rabbits, for example, the drug produces an abnormal electroencephalogram by a mechanism different than that provoked by *d*-amphetamine.¹⁰ Attempts have been made to correlate behavioral and pharmacological effects of STP relative to its sites of accumulation in the brain.¹¹ Idanpaan-Heikkila, Fritchie & McIsaac found accumulations of tritium labeled STP in the hippocampus and the amygdaloid nucleus as well as the hypothalamus. They noted that the site of accumulation of a drug does not necessarily correspond to its site of action, but speculated that high concentrations of STP in these areas could account for its emotional, behavioral disturbances. In addition, they noted selective concentration of STP in the medial and lateral geniculate bodies and in the cerebellum fastigial nucleus and in the olfactory nuclear area in the frontal region of the brain. They speculated that accumulation of STP in visual pathways of the central nervous system could be related to the production of hallucinations in man.

Whatever the mechanism of toxicity, STP has developed a "bad name" in the drug using community and many drug-users are now avoiding this drug. However, STP has continued to appear disguised in the form of brand names, such as the wedge series. The pink, purple, orange, and yellow wedge contained varying concentrations of STP as verified by laboratory analyses (e.g., purple wedge, 6 mg. STP and yellow wedge, 5 mg. STP). Although incidence data is not readily available, it is quite apparent that the prolonged duration of action of STP and intense peripheral amphetamine-like effects contribute to the acute toxicity. It would also appear that the acute panic reaction is a major contributor to the flashback or delayed reaction and it still appears that high doses of chlorpromazine prolong the disability of the STP intoxication. The author feels that sedative medication such as Librium®, or Valium® should be used for anxiety and that chloral hydrate should be used for sleep induction with avoidance of the phenothiazines.

It is difficult to predict a future of the psychotomimetic amphetamines in general although MDA or methylenedioxy-amphetamine may potentially, at least, be the most important in the future. In April, 1970 an article in the *Berkeley Barb*, entitled "How to Turn Speed to Love," described MDA "as the new love drug

which had been getting rave reviews in the Diggers Chamber of Commerce." In addition to describing the virtues of the drug, the article indicated that at the present time MDA was not illegal to prepare, possess or use. It is this type of advanced publicity that has heralded increases in the use of other drugs including STP. Cases of MDA ingestion seen by the author indicate that the effects are quantitatively similar to those of LSD for the first 6 to 8 hours, but that the amphetamine-like effects persist longer and euphoria may be experienced rather than depression which frequently occurs coming down from LSD. A few subjects apparently resent the stimulation which they associate with "speed," but in general they say the experience is quite comparable and occasionally preferable to LSD in that less disturbance of thought occurs. Dosage required of the drug is comparatively large, however, and at least one death has occurred in association with the use of MDA in combination with another drug.² At present it is impossible to predict whether MDA or any of the other psychotomimetic amphetamines will represent major toxicological problems, although in May, one month following the *Berkeley Barb* article, three teachers volunteering for the Haight-Ashbury Clinic reported a marked increase in MDA use in at least two Peninsula high schools.

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