Medical Aspects of Drug Abuse

PAUL DEVENYI, MD

"Drugs are often taken in various combinations, in which case it is difficult to sort out the primary effects and choose the most rational emergency treatment."

THE PURPOSE OF this paper is to give the practicing physician a quick and simple guide to the drug scene, emphasizing the pharmacological and pathophysiological effects, and outlining forms of acute treatment. Information on the psychosocial aspects of drug abuse can be found elsewhere.[3, 5]

The abuse of drugs and chemicals is a major concern of our society today, although it is nothing new in men's striving to alter temporarily his consciousness, pleasantly distort his perceptions, seek oblivion by transient exclusion of reality; in short to get intoxicated.[1] History is full of evidence of man's ingenuity in bringing about such a state.

There is some concern that drug abuse is reaching epidemic proportions, especially among the young, and that the current drug-scene is in some way connected with social dissatisfaction and political protest. Although our society may be overreacting to the situation, intelligent and objective evaluation, such as that conducted by the Ledain Commission, is obviously necessary. The "drug problem" is being examined by social and behavioral scientists, epidemiologists, educators, and others and the literature on this subject is growing almost as fast as the problem itself.

Medicine, of course, has its own responsibility if drug abuse is indeed becoming a clinical entity. The physician is often the first one to be contacted, at least in some critical, emergency situations. Some medical complications of drug abuse are non-specific, such as hepatitis associated with the use of contaminated needles.[2] The doctor faces the greatest difficulty when he is called upon to treat the effects of drugs whose pharmacology he is unfamiliar with; often he may not know how to find out what his patient has ingested.

Drugs are defined in a broader sense than the traditional, medical one: "a drug is any substance, other than those required for the maintenance of normal health (as opposed to the correction of disease), which by its chemical nature alters the structure or function of a living organism".[7, 8] According to this definition the traditional medical drugs, as well as those that have no accepted medicinal use, will fall into this category (including marihuana, LSD, morning glory seeds, model-glue, coffee, tobacco and alcohol). So far as drug abuse is concerned, we're dealing primarily with the so-called *psychoactive drugs* which affect mood, perception and consciousness.

Drug abuse is defined as the use of drugs that originate from non-medical sources and are used for non-medical reasons, or medically prescribed drugs used for purposes other than those for which they were prescribed, and/or drugs used in quantities exceeding the prescribed dose.

Drug dependence is a frequently used term to designate

Dr. Devenyi is a physician with the Addiction Research Foundation and a Clinical Teacher with the Department of Medicine of the University of Toronto.

the consequences of longterm, repetitive drug abuse. Sharp demarcation between psychological and physical dependence is not always possible. Generally speaking, however, *psychological dependence* is a purely psychological need to repeat the desired drug effect. *Physical dependence* or *addiction* means a metabolic or central nervous system adaptation to the drug, whereby the abrupt discontinuation of the drug will produce a characteristic *withdrawal syndrome.* In this case, the need for repeated drug intake is partly dictated by the need to prevent or eliminate the withdrawal symptoms.

Tolerance to a drug is defined as a need to increase the dose in order to obtain the same effect. Tolerance is intimately connected with, but not equivalent to physical dependence.

Kalant[8] classifies three major groups of psychoactive drugs:

1. Central nervous system depressants.
2. Central nervous system stimulants.
3. Distorters of consciousness and perception.

Central Nervous System Depressants

These include opiates and synthetic narcotics, hypnotics and sedatives, tranquilizers, and alcohol. Opium derivatives and the synthetic narcotics (e.g. meperidine, pethidine, alvodine, methadone) have two outstanding effects: analgesia and euphoria, presumably having their primary effect on the "pleasure center" as described by Olds et al.[9] Non-medical use of opiates for clearly pleasure-seeking purposes is hundreds of years old. Apart from professional and medical addicts, "criminal" heroin use in Canada until recently was limited to a few thousand people in large urban centers. There are recent signs, however, that heroin use is now rapidly infiltrating the drug repertoire of our young people.

It is well-known that opiates constrict the pupils – a frequently used sign to recognize the opiate user; they slow down the intestinal peristalsis, resulting in a common complaint of narcotic addicts – constipation. Vomiting is a frequent concomitant of initial opiate use, but one which the addict is willing to put up with (and eventually overcomes) in order to get his desired euphoria.

Tolerance to opiates and synthetic narcotics develops rapidly; an addict can use many times the dose that would be fatal to the novice. Physical dependence to these drugs occurs quickly; upon sudden discontinuation of the drug, the characteristic withdrawal signs are: dilated pupils, restlessness, goose-pimples, muscular and abdominal cramps, and diarrhea. Another dose of the narcotic will temporarily relieve the withdrawal symptoms, and this encourages the addict to keep up his supply.

Treatment of opiate addiction generally gives poor results in the long run; the recidivism rate is very high. Recently, somewhat more promising results were reported with methadone maintenance treatment.[10] Methadone, an orally effective narcotic, gives some of the desired euphoric effect to the addict; it can be given once a day, thus eliminating the need for full-time criminal activities to secure the illicit drug supply. It also blocks the effect of heroin. Other narcotic antagonists have been tried for longterm treatment, such as cyclazocine[11] and naloxone.[12] It is generally agreed however that longterm maintenance management of opiate addicts should not be undertaken by private practitioners and should be confined to specialized facilities.

Methadone, although effective in temporarily relieving the opiate withdrawal syndrome, should not be used solely for this purpose. Opiate withdrawal is very unpleasant but not life-threatening: "cold turkey" withdrawal will not kill an addict. Diazepam (Valium) in 10-40 mg doses im will give some relief.

Methadone can be used, however, in well-motivated addicts for gradual withdrawal purposes when the ultimate therapeutic goal is total withdrawal. This should be done only in hospital. The initial methadone dose will be between 40-150 mg per day per os, depending on the patient's tolerance, and the dose should be reduced by 10 mg daily, or every second day.

So methadone, while useful for maintenance therapy (by specialized facilities) or for gradual and total withdrawal (in hospital), should not be used as a single dose, emergency treatment for the temporary alleviation of withdrawal symptoms.

Hypnotic and sedative drugs are widely-prescribed sleeping pills and daytime sedatives. Abuse of these drugs is common and they are relatively easy to obtain both on the black market and from physicians with lax prescribing habits. Such drugs as chloralhydrate, gluthetimide ethchlorvynol have all been known to produce physical dependence. The most important group of drugs in this category are the various barbiturates.

Tolerance to barbiturates does not develop nearly to the same degree as with opiates. While there may be complete tolerance at lower dose levels, at higher doses (e.g. 600-800 mg per day) tolerance is never complete: some intoxication will always be present in people who take such high doses. Barbiturates depress the reticular activating system in the brainstem causing intoxication clinically similar to that of alcohol. Physical dependence easily develops in people who take 500-1,000 mg a day over several weeks; sudden withdrawal of the drug will result in restlessness, hypotension, convulsions and delirium which could be fatal. On that basis the withdrawal syndrome of barbiturate addiction is more dangerous than that of opiates.[13]

If you suspect physical dependence on barbiturates, don't order abrupt discontinuation of the drug. Stabilize the patient on his own usual dose level, preferably with a short acting barbiturate (such as pentobarbital q6h) and then decrease the dose gradually by 100 mg daily.[14]

Barbiturate dependence is also common in alcoholics,[15] and in combination with narcotic addiction.[16] In the current youth drug scene, barbiturates have only a marginal

role,[17] but there is evidence of a shift towards this dangerous form of drug abuse.[18]

Tranquilizers are customarily distinguished from sedatives in their primary effect on emotional reactions, probably acting on the limbic system. The so-called major tranquilizers (phenothiazines, reserpine, haloperidol) are not involved in drug abuse and are not known to produce physical dependence. The minor tranquilizers however, such as chlordiazepoxide, diazepam and meprobamate may produce physical dependence after prolonged use, and withdrawal symptoms similar to those of barbiturates. In the latter case, the same principles of withdrawal treatment would apply.

Central Nervous System Stimulants

These include antidepressants, amphetamines and related drugs, and cocaine. Antidepressants are listed here as a matter of convenience, although they do not strictly qualify as CNS stimulants. They are used for the relief of emotional depressions, and in normal, non-depressed people they have no stimulating effects; in fact they may even act as mild sedatives.[8] They are not known to play any role in drug abuse.

Amphetamines and a number of related substances (methylphenidate, phenmetrazine) act on the reticular arousal system by stimulating its functions. As a result, they produce wakefulness, increased alertness, exaggerated activity, and a sense of exhilaration and power. They also have sympathomimetic effects: dilatation of pupils, tachycardia, increased systolic pressure, hyperglycemia, bronchodilation. Their appetite-depressing action was their main therapeutic use, but this use for them is now falling into disfavor: the chief medical indication is for narcolepsy and the treatment of hyperactive children (the latter is a paradoxical, but empirically effective treatment).

The appeal of amphetamines and related drugs to abusers is not difficult to understand in view of their CNS stimulating effects. Abuse of orally taken drugs is not uncommon, but in recent years special concern has arisen about the intravenous use of methamphetamine, known in common parlance as "speed".

Considerable tolerance can develop to amphetamines: it is not unusual to see abusers who consume 100 times as much as the therapeutic dose. The question of physical dependence is a somewhat controversial one. Some people deny its existence and state that with amphetamines there is no withdrawal syndrome. Kalant,[21] however, has pointed out that there is no reason to expect an opiate-type withdrawal syndrome after the chronic use of a stimulant; the depressive symptoms following the discontinuation of amphetamines can be regarded as a legitimate withdrawal syndrome. Nevertheless, abrupt withdrawal even after heavy and chronic amphetamine use is permissible. Antidepressants may have to be used in the withdrawal period.

Chronic intoxication with stimulant drugs produces both sympathetic and central nervous system stimulation. A psychotic state resembling paranoid schizophrenia ("amphetamine psychosis") may develop both in chronic intoxication and as a result of single, large doses; the treatment of this condition consists of immediate withdrawal of the drug and the administration of major tranquilizers.[22]

Cocaine is a stimulant despite the fact that it is classified as a narcotic by law. Its only medicinal use is as a topical anesthetic. It is abused in the form of chewing coca leaves, sniffing, or intravenous injection. The drug does not produce physical dependence, and tolerance to it does not develop to any appreciable degree.

Distorters of Consciousness and Perception

These include LSD, DMT, TMT, STP, MDA, mescaline, psilocybin; the organic solvents (model-glue, nail polish remover, and cannabis (marihuana, hashish, THC). This group of drugs defies pharmacological classification and it is difficult to give a rational description of their effects. They may all have varying degrees of depressant or stimulant action, but primarily they alter the user's perception of external environment and himself. Some people call these drugs psychedelic, others call them psychotomimetic. They are also sometimes labelled hallucinogenic drugs, although true hallucinations are not usual concomitants of these drugs.

Most of the more potent drugs in this group have some initial symphathomimetic effects: tachycardia, dilation of pupils, dry mouth, hyperreflexia. Heightened and eventually distorted perception, occasional hallucinations, and depersonalization follow, and some users describe these as very pleasurable. In others, however, a panic state ("bad trip") occurs which sometimes may develop into a frank psychotic reaction. "Flashback" refers to a recurrence of the perceptual and emotional reaction, in the absence of further drug consumption.

The effect of marihuana intoxication is often referred to as a mild, meditative euphoria as opposed to the "acting-out" type of reactions observed with other drugs. This however applies only to the usual "social" use of smoking marihuana. Chronic effects of these drugs are not yet known; chromosome-breakage has been described, especially in connection with LSD, although this has not been reliable confirmed.[23]

Generally, this group of substances does not produce physical dependence; a characteristic withdrawal syndrome is not anticipated when they are suddenly discontinued. Tolerance, however, does develop rather rapidly to LSD and some similar drugs; in fact, each subsequent dose has to be considerably increased to obtain the same effect. Some marihuana users describe a phenomenon of "reverse tolerance" (less and less needed for subsequent occasions), but this has been questioned by others, and there are even reports about increased tolerance to more powerful cannabis preparations.[24]

Treatment of a "bad trip" on LSD and other similar drugs generally consists of "talking down" the tripper in a pleasant, reassuring environment. In cases of panic or psychotic reaction the administration of a tranquilizing drug is indicated; Solursh and Clement[25] advocate the use of high doses of diazepam as the drug of choice: 40-50 mg at once, followed by 10 mg every four hours as necessary.

The physician when called upon to treat a "drug-crisis", faces a difficult situation. Often the patient does not know what he has taken, or has consumed something other than he thinks he has. A recent study analyzing various samples of street drugs indicated great discrepancy between their true composition and their alleged content.[26] An additional difficulty is that drugs are often taken in various combinations, in which case it is difficult to sort out the primary effects and choose the most rational emergency

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chapter on vomiting in which he cautions the reader to observe the urine in the pregnant patient for possible pyelonephritis. Certainly, biliary tract disease is a far more common cause of vomiting in pregnancy than pyelonephritis, but this is not mentioned. It would seem that Seward's notes on obstetrics and pediatrics are not quite complete and, as such, should probably be omitted from this otherwise thorough approach to diagnosis.

Seward's style is personal as well as scholarly; moreover he does not encumber the reader, as is often the case in standard texts, with innumerable rarified diseases, but presents the family physician with an excellent and refreshing method of "Bedside Diagnosis".

Reviewed by R. Johnston, MD. (Dr. Johnston is an obstetrical resident at McMaster University, Hamilton.)

Essays Offer Excellent Practical Advice

Title: **The Understanding Physician**
Aithor: Charles D. Aring, MD
Publisher: Wayne State University Press, Detroit, Mich. 48202
Price: $8.95
Pages: 214

In 32 essays, Aring, a distinguished Cincinnati neurologist, covers a wide spectrum indeed. Among his subjects are "the student and his role in medical education", "the physician's constitution", and "on writing for medical journals."

Yet when one reads the book it quickly becomes apparent that any superficial diffuseness is illusory. In fact there is a strong common theme, an Oslerian interest and belief in the primacy of humanism to help any doctor be both a good physician and a good person simultaneously.

On this basis alone, Aring's essays are worth reading. But in addition, they contain much excellent practical advice, and they also illustrate many of the principles of sound, clear, concise medical writing. I find it especially interesting to compare early essays with the more recent, to observe the evolution of Aring's literary style. He was by no means a bad writer in the beginning, but he is definitely better now – a fact that should encourage all of us who struggle to communicate clearly and unequivocally.

I recommend this book unreservedly for all medical students and physicians.

Reviewed by Charles G. Roland, MD. (Dr. Roland is chairman of the department of biomedical communications at the Mayo Foundation).

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treatment. As always, a good clinical judgment, the history, and some of the physical signs may help; chemical analysis of blood and urine samples are now available to detect such substances as barbiturates, tranquilizers, opiates, amphetamines, and alcohol.

Whether or not public concern about drug-abuse is justified remains to be seen. It is difficult to decide if we are dealing with a fad or with a legitimate new clinical entity. There are even those who suggest that exaggerated social concern and the mushrooming of helping agencies perpetuate, encourage and spread the problem rather than reduce it. It is still uncertain whether drug-abuse justifies a bona fide clinical approach. The Addiction Research Foundation's newly-established Clinical Institute may answer some of these questions by studying various therapeutic approaches in a sample of drug abusers in its in-patient, outpatient, and emergency facilities. In the meantime, it provides the practicing physician with a convenient referral source if he feels that a particular problem is beyond the scope of his competence or interest. ◀

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