How to spot illicit drug abuse in your patients

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CME learning objectives

- To understand the pharmacologic mechanisms of various classes of illicit drugs
- To recognize clinical clues to abuse of specific drugs
- To learn how to differentiate between drug-induced conditions and psychiatric illness

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This page is best viewed with a browser that supports tables

Preview: Although the incidence of drug abuse may be stabilizing in some areas of the United States, many of your patients may present with telltale signs of a drug-induced condition. What are the clinical clues that suggest use of various types of drugs? How can you differentiate between drug-induced conditions and psychiatric illness? The authors of this article answer these questions and review the clinical pharmacology of the most common classes of illicit drugs. They also provide a handy list of contemporary street names and adverse effects of the five main types of drugs of abuse.
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Illicit drug abuse remains a significant health problem in the United States, especially among teenagers (see box below). Therefore, it is important for physicians to be aware of clinical signs and symptoms of drug abuse as well as common behavioral patterns of users. Knowledge of the basic terminology of drug abuse can help clarify the powerful influence illicit drugs have on users.

Drug abuse terminology

An *illicit drug* is any chemical or mixture of chemicals not required for the maintenance of health that alters biologic function or structure. The term applies primarily to illegal medications. *Abuse* is the self-administration of any drug in a manner sufficient to cause adverse consequences to the user. As abuse continues, a pattern of addiction may

develop. *Addiction* is a behavioral pattern characterized by an overwhelming, compulsive involvement with use of a drug and the securing of its supply as well as a high tendency toward relapse after use of the drug is discontinued (1). Although tolerance, dependence, or both are often present, they are not synonymous with addiction, which is a specific pattern involving a physical and psychological need (craving) for the substance and continual compulsive use despite adverse consequences (2).

The pleasurable effects of an illicit drug serve as *positive reinforcement* for the user to continue to self-administer the drug. The neurochemical basis of this reward is thought to be a consequence of the drug's effects on neurotransmission and may involve a common enhancement of dopamine in the central nervous system (CNS) (2,3).

Pharmacologic effects of illicit drugs

The various drugs of abuse can be classified according to their unique pharmacologic mechanisms of action. Five major categories are discussed: (1) cannabinoids, (2) opiates, (3) stimulants, (4) hallucinogens, and (5) inhalants. The street names of commonly abused substances and their adverse effects are listed in table 1.

Table 1. Selected street names and adverse effects of illicit drugs

Drug	Selected street names	Adverse effects
CANNABINOIDS		
Marijuana and hashish	Bag, Colombian, doobie, dope, grass, hash, hump, Jay, joint, lid, Mary Jane, pot, reefer, sinsemilla, weed	Red eyes, neglect of appearance, loss of interest and motivation, possible weight loss
OPIATES		
Heroin	Black tar, China white, dog food, dreamer, dust, H, horse, junk, scag, smack	Addiction, severe withdrawal symptoms, loss of appetite, death from overdose
STIMULANTS		

Cocaine	Bernice, blow, C, coke, crank, flake, freeze, jam, lady, leaf, snow, stardust, toot, white lady	Addiction, hypertension, sleeplessness, restlessness, anxiety, lung and nasal damage, intense high followed by frequent dysphoria, loss of appetite, intense psychological dependence, death from overdose
Amphetamines	Bennies, black beauties, copilots, crank, crystal, dexies, eye opener, footballs, glass, hearts, ice, ice cream, lid, meth, moth, quartz, speed, uppers	Addiction, hypertension, loss of appetite, paranoia, hallucinations, coma, convulsions, excessive irritability, nervousness, mood swings, hyperactivity, brain damage, death from overdose

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HALLUCINOGENS

Lysergic acid diethylamide (LSD)	Acid, barrels, blotters, blue heaven, California sunshine, cubes, domes, flats, frogs, lids, microdot, purple haze, sugar cubes, windowpanes	Dilated pupils, hallucinations, illusions, mood swings, flashback, breaks from reality, emotional breakdown
Mescaline and psilocybin	Buttons, cactus, magic mushrooms, mesc, TMA (a mixture of mescaline, LSD, and marijuana)	Dilated pupils, hallucinations, illusions, mood swings, breaks from reality, emotional breakdown
Phencyclidine (PCP)	Angel dust, clicker, crystal, dummy dust, hog, horse, killer, krystal joints, love, mint weed, PeaCe Pill, sherms, super grass, weed	Slurred speech, blurred vision, confusion, agitation, aggression, ataxia, anxiety, depression, impaired memory and perception, acute psychosis, convulsions, increased heart rate and blood pressure, death from accidents or overdose
Methylated amphetamines ("designer drugs")	Adam, China white, ecstasy, Eve, love	Hypertensive crisis, hallucinations, nausea,

	drug, MDA, X, XTC	confusion, sleeplessness, increased blood pressure, profuse sweating, mood elevation

INHALANTS		
Dry cleaning solution, fingernail polish remover, gasoline, glass chillers, hair spray, insecticides, model airplane glue, nitrites (amyl and butyl), nitrous oxide, paint thinner, petroleum products, plastic cement, rubber cement, typing correction fluid	Gas, glue, laughing gas, liquid paper, sniff, whippets	Nausea; nosebleeds; poor motor coordination; light-headedness; headache; anemia; anoxia; neuropathy; brain, liver, and bone marrow damage; drastic weight loss; high risk of sudden death; impaired vision, memory, and thought processes; abusive, violent behavior

Cannabinoids
This family of chemicals is present in marijuana and hashish, which are derived from several types of hemp plant (*Cannabis* species). Marijuana, the most common illicit drug in the United States, is currently used by an estimated 37.5 million people (4). Hashish is the concentrated resin extracted from the top of hemp plants.

The major psychoactive ingredient in marijuana and hashish is tetrahydrocannabinol (THC). Higher concentrations of THC are found in hashish than in standard illicit marijuana products consisting of flowering tops and leaves. The intoxicating effects of THC include euphoria, pacification of the user, and a dreamy state of relaxation. Although the exact mechanism of action is still poorly defined, recent research indicates that THC may exert its activity via the newly discovered anandamide receptor (2,3,5).

When THC is smoked, the effects begin within minutes and last 1 to 3 hours. The signs and symptoms of THC use are euphoria, shortened attention span, red eyes, anticholinergic symptoms (eg, dry mouth), and depressed cognitive and motor skills. Adverse effects include tachycardia and hypertension, which peak 20 minutes after use and may be particularly dangerous in users with existing cardiovascular problems. No deaths due to overdose have been reported. However, related cases of hepatitis have occurred, probably as a result of use of marijuana that was grown in fields fertilized with human feces and was not properly washed before processing. In addition, some preparations of marijuana may be extremely neurotoxic, because the leaves and flowering tops are sometimes soaked in formaldehyde before processing, which is thought to produce a longer "high."

Because THC is highly lipid-soluble, it accumulates in fat cells with continued use. The agent is slowly distributed out of the cells and eliminated through both urine and feces. Depending on assay sensitivity, individual metabolism, and the dose smoked, metabolites of THC can be detected in urine for 1 day to a week or longer after acute use (6).

Opiates

Opiates are produced from *Papaver somniferum*, one of the many species of the poppy plant. The seedpods are removed after blooming and are scored lightly with a knife, which releases a milky white sap. When dried, the sap forms a thick, gummy, brown oxidized substance called opium. Opium contains over 60 pharmacologically active ingredients, including codeine and morphine.

Morphine was first isolated from opium in 1806 by German pharmacologist Friedrich Wilhelm Sertürner. The new agent was found to be 10 times more potent than crude opium. In 1847, British chemist Alder Wright produced diacetylmorphine, a morphine analogue. This discovery went unnoticed until 1889, when German pharmacologist Heinrich Dreser (who also discovered aspirin) noticed that diacetylmorphine was almost 10 times more potent than morphine. The agent was viewed as a new treatment with "heroic" possibilities and was named heroin. Both heroin and morphine were widely used as over-the-counter pain relievers in the 19th century.

Opiates act on the delta, kappa, lambda, and mu subtypes of opiate receptors in the brain. Drug binding to opiate receptors mimics the actions of endorphins, which are involved in regulation of pain and pleasure.

The Food and Drug Administration (FDA) considered heroin abuse to be the No. 1 drug problem until 1986, when cocaine abuse took the lead. Nevertheless, heroin is still used regularly by 1.5 million people in the United States. It is classified as a Schedule I agent by the Drug Enforcement Administration and has no accepted medical use in this country. Most users prefer to inject heroin, because the intravenous and subcutaneous routes give a faster, more intense peak effect and because the potency of much street heroin is low. Signs of recent heroin injection are phlebitis and bruises from multiple needlesticks. Long-term abuse often causes varying degrees of scarring, which may require close inspection to identify. Skin abscesses, hepatitis, and AIDS are common in persons who inject heroin or other types of drugs.

Common effects of heroin include euphoria due to potent stimulation of opiate receptors. Stimulation of sensory cortex receptors may also cause lethargy, sedation, and slurred speech. Emesis may result from stimulation of the chemoreceptor trigger zone, and miosis usually occurs in response to stimulation of the oculomotor nerve. Respiratory depression, the most common cause of death by overdose, occurs with inhibition of the neurogenic and carbon dioxide drives. In addition, severe bradycardia may result from stimulation of the vagus nerve. Prolonged anoxia can lead to other cardiovascular and renal toxic effects, including mydriasis (6).

In the liver, heroin undergoes deacetylation to morphine, which is then excreted in the urine. Thus, drug testing for heroin is designed to detect morphine in the urine. As drug testing becomes increasingly common, it is important to be aware that commercial poppy seeds may contain enough morphine or codeine to produce positive results on urinalysis. Other opiates have similar metabolic and elimination pathways.

Stimulants

The main CNS stimulants that are abused are cocaine and amphetamine. Cocaine is extracted from the leaves of low-growing coca shrubs (*Erythroxylon coca*), which grow primarily in the Andes Mountains of Peru and Bolivia. Coca leaf continues to be used by natives of South America in religious ceremonies. The leaf contains about 1% cocaine by weight. Chewing a leaf with lime or ash allows the cocaine to be absorbed through the mucous membranes of the mouth, although swallowing causes the drug to be partially inactivated by gastric acid. Chewing generally produces a mild stimulant action with little or no euphoric intensity ("rush") and limited dysphoria ("crash") as the blood level declines.

Cocaine was relatively unknown outside South America until the 1800s, when Europeans began exploring Peru. Coca samples were brought back to Europe, and scientists developed the techniques for extracting and purifying cocaine salts from the leaves. The water-soluble hydrochloride salt form is still used during nasal surgery as a local anesthetic and vasoconstrictor. The hydrochloride salt is also the most common illicit drug form, which is crystallized from the crude paste concentrate of cocaine alkaloids.

Intranasal administration of illicit cocaine hydrochloride was found to produce a more intense response than chewing of the leaf. However, because the drug constricts blood vessels in the nose, systemic absorption is still limited. When smoked, pure cocaine is rapidly and completely absorbed from lung tissue, producing an intense high of very short duration followed by a strong dysphoric crash. Because the cocaine salt is broken down at high temperatures, cocaine hydrochloride first must be made into its freebase form (cocaine). Freebasing cocaine results in a very intense rush (reportedly more powerful than that from an intravenous injection) within 10 to 15 seconds after inhalation. This euphoria lasts only 10 to 20 minutes and is often followed by a crash and craving for another dose.

Amphetamine and cocaine are very similar pharmacologically, with the main difference being duration of action. The effects of some forms of amphetamine can last up to 14 hours, or three to five times longer than those of cocaine. The mechanisms of action of both drugs are complex and involve inhibition of reuptake of dopamine, norepinephrine, and serotonin (7). The initial effects result in dramatic increases in neural pathway activity but can lead to depletion of these monoamine neurotransmitters with long-term use. Such depletion probably accounts for the depression commonly observed in heavy users.

Because of their agonistic effects on sympathetic catecholamine receptors, both cocaine and amphetamine enhance the activity of the sympathetic branch of the autonomic

nervous system. Such enhanced activity leads to increased pulse rate, blood pressure, and respiratory rate. Blood flow decreases to the viscera and extremities but increases to the brain and the large muscle groups. Sweating increases, and body temperature may become elevated. The pupils dilate but remain reactive to light. Although stimulants suppress the appetite initially, the dose must be steadily increased to maintain this effect over time.

Moderate doses of stimulants produce a sense of elation and mood elevation. Users become more talkative and sociable. Alertness and arousal are heightened, and marked insomnia often develops. At proper doses, these drugs can enhance performance of various activities involving physical strength and endurance, such as running and swimming.

Because stimulants increase resistance to fatigue and boredom, they have often been used as an aid for studying. The agents have been found to produce a state-dependent learning; that is, information learned under the influence of a drug is best recalled when the person is in a similar drug-induced state. Recent data suggest that stimulants may actually impair some aspects of the user's learning ability.

Other adverse effects of stimulant abuse include convulsions; seizures; ventricular fibrillation and coronary artery vasospasm, which can precipitate a myocardial infarction; and strokes related to hypertension. Stimulant intoxication can also produce paranoid delusions, paranoid psychosis, and an altered tactile sensation of bugs moving under the skin (ie, formication). Because of its extended duration of action, amphetamine may be more likely than cocaine to cause a paranoid state, which can lead to acts of violence or suicide. Cocaine use during pregnancy has resulted in stillbirths and other fetotoxic effects as well as cocaine-addicted newborns. Additional toxic effects can be produced by street cocaine that has been laced with other substances. Death due to overdose can occur with cocaine but is more common with amphetamine.

Hallucinogens

Hallucinogens include a wide range of agents that can alter consciousness in profound and sometimes bizarre ways. The four subclasses are: (1) serotonergic hallucinogens, (2) anticholinergic agents, (3) dissociative anesthetics, and (4) methylated amphetamines ("designer drugs").

Serotonergic hallucinogens: Lysergic acid diethylamide (LSD), psilocybin, and mescaline are the primary serotonergic hallucinogens. LSD is relatively easily manufactured in a laboratory. Psilocybin is found in various species of mushrooms, and mescaline is one of the active agents present in the peyote cactus.

Serotonergic hallucinogens often produce vivid visual hallucinations characterized by an array of brilliant colors, disruptions of time and space perception, and feelings of weightlessness. Other effects include mystical thinking, pupil dilation, recklessness, sleeplessness, slurred speech, hyperarousal of the CNS, and loss of coordination. Convulsions and hyperthermia also may occur. LSD may cause psychosis and sexual

problems (eg, loss of libido) because of its high affinity for lipids in the brain and reproductive organs.

An LSD "trip" typically lasts 6 to 18 hours. The effects of psilocybin and mescaline mimic those of endogenous serotonin and can last 8 to 12 hours (1). All of these agents may produce highly variable effects, depending on the dose taken as well as the mood and environment of the user at the time of use.

Anticholinergic agents: Atropine and scopolamine are present in plants such as belladonna and jimsonweed. These drugs block muscarinic receptors in the brain and may produce a dreamlike trance from which the user may awaken with little or no memory of the experience. Global confusion and agitation are common in acute intoxication. Because the effects are often perceived as negative or may not be remembered, these drugs are rarely intentionally abused. They also block cholinergic receptors peripherally; thus, overdoses can cause the classic anticholinergic crisis seen with synthetic drugs such as benztropine mesylate (Cogentin).

Dissociative anesthetics: This subclass of hallucinogens includes phencyclidine (PCP) and the related compound ketamine hydrochloride (Ketalar). These agents are thought to act through a specific receptor (*N*-methyl-d-aspartate) that influences activity of the excitatory amino acid neurotransmitter glutamate. The effects from smoking PCP last only 4 to 12 hours, but those from oral doses may persist for days. The trip typically consists of numbness, a sense of strength and invulnerability, a blank stare, rapid and involuntary eye movements, and an exaggerated gait. Auditory hallucinations, image distortions, and severe mood disorders may lead to severe paranoia, acute anxiety, feelings of impending doom, and violent hostility. Extreme psychotic reactions may occur with the first use, and continual use may lead to persistent schizophrenia.

Methylated amphetamine derivatives: Agents such as MDA (methylenedioxyamphetamine) and MDMA (methylenedioxymethamphetamine) are called designer drugs, a general term for structural analogues of existing Schedule I and Schedule II agents. Although these drugs are structurally related to amphetamine, they produce alterations in mood and consciousness with little or no sensory change. Both MDA and MDMA promote a significant release of serotonin from presynaptic vesicles, which leads to a profound decrease in serotonin brain levels with continual use.

MDA, one of the first designer drugs, produces a sensual, easily managed high that some users claim to be aphrodisiac. Both MDA and MDMA are sought after as sexual enhancers. Users often report changes in emotions, euphoria, and ecstasy.

MDMA, also known as "ecstasy" or "Adam," is an increasingly popular recreational drug of abuse. It was originally synthesized as an appetite suppressant in 1914 but, because of its toxic side effects, was never marketed. MDMA may produce pseudohallucinations and illusionary experiences affecting multiple senses (visual, auditory, and tactile). In the drug-induced state, the user is aware that the hallucinations are not real.

With long-term use, these agents are toxic to serotonin nerve terminals and can cause muscle tension, ataxia, sweating, and blurred vision. Drug-related fatalities are rare, because the lethal dose is believed to be 10 to 100 times the effective dose.

Inhalants
Inhalants are mood-altering substances contained in commercial and household items. Because such products are easily obtained, they are often the first experimental agents used by children. The four main classes of ingredients in these products are (1) volatile solvents, (2) amyl nitrite and butyl nitrite, (3) general anesthetics, and (4) aerosol propellant gases.

Volatile solvents include plastic cement, fingernail polish remover, lacquer, paint thinner, and petroleum products. Amyl nitrite and butyl nitrite are used medically as vasodilators to relieve angina, but they are included in this category because of their intoxicating effects. Anesthetics include products containing ether, chloroform, or nitrous oxide. Aerosol gases are present in hair spray, insecticides, glass chillers, and vegetable-oil lubricants for frying pans.

Acute effects of inhalant abuse include rapid but short-lived disorientation, impairment of driving, headaches, dizziness, weakness, irritability, visual distortion, hallucinations, unconsciousness, and suffocation. Signs suggestive of acute inhalant abuse include the presence of odor or residue of the substance being abused, sneezing, coughing, runny nose, slurred speech, poor balance and coordination, and gaze nystagmus. Tolerance often develops, causing the need for increasing doses. Permanent brain damage may result from prolonged use. Death can occur from lack of blood cell production or from suffocation. Lethargy, depression, and behavioral symptoms similar to delirium tremens have been observed during withdrawal from frequent use of products containing toluene (eg, model airplane glue).

Differentiating between drug abuse and psychiatric illness

Psychiatric symptoms are a common clinical presentation of illicit drug use. Depression, mania, anxiety, and psychosis can all be substance-induced. In a study examining the frequency of cocaine-related medical, surgical, and psychiatric problems presenting in an urban hospital emergency department (8), psychiatric complaints accounted for 30.6% of the presentations. Depression with suicidal ideation was the most commonly reported symptom. Another study (9) reported that one in five persons who committed suicide during a 1-year period in New York City had used cocaine immediately before his or her death.

Differentiating between primary psychiatric symptoms and drug-induced psychiatric symptoms can be difficult and at times impossible, because use of illicit substances often complicates the assessment of a primary mental disorder. Symptoms may be the result of drug use alone, the manifestation of a psychiatric illness, or a comorbid presentation of both substance abuse and a psychiatric condition.

The following relationships between drug abuse and psychiatric disorders are possible (10):

1. Illicit drug abuse is causing the psychiatric disorder.

2. Drug abuse is a secondary effect of the psychiatric disorder (ie, the patient is using drugs to either self-medicate against or enhance symptoms of the disorder or to counteract the side effects of medication prescribed for the disorder).

3. Psychiatric illness and illicit drug use exist independently.

Detecting the presence of a psychiatric disorder unrelated to illicit drug use is critical to providing appropriate treatment and avoiding unnecessary exposure to medication. A thorough knowledge of substance-induced syndromes and major mental disorders combined with a carefully performed physical examination is the key to differentiation. The following patterns suggest primary substance use (10):

- Absence of mood or psychotic symptoms when illicit drugs are not used, a rapid clearing of symptoms on discontinuation of drug use, or both
- Intensity of symptoms that varies directly with the amount of drug used
- Symptoms that fit no criteria for a well-defined psychiatric disorder but vary widely over time and with the substance used
- No personal or family history of psychiatric disorders
- A history of poor response over time to various psychiatric treatments
- Awareness by the patient that symptoms are the direct result of substance use

For example, a 45-year-old certified public accountant with no past psychiatric history who has paranoid delusions and uses amphetamine to stay awake during tax season is highly unlikely to have a primary psychiatric disorder (eg, schizophrenia). However, a psychiatric illness is likely in a patient who (1) shows clear evidence of a psychiatric syndrome during a period of total abstinence or casual drug use, (2) has a positive family history of psychiatric illness, and (3) has responded to past treatment with a particular psychopharmacologic medication by decreasing or discontinuing illicit drug use.

Evaluation of possible drug abuse

Because illicit drug abuse is widespread, it should be considered in differential diagnosis of many physical and nearly all psychiatric complaints. Obtaining a thorough history of substance use is important in all patients and should include types of drugs, routes of administration, frequency and duration of use, and time of last dose. Because many drug users, particularly adolescent users, are reluctant to provide a history, the information they give may not be reliable. However, collateral data collection and inquiry into social and occupational functioning can provide clues to unreported substance use. Failure in school, chaotic family relationships, and changes in peer relationships are worth investigating. Motor vehicle accidents, criminal behavior (especially theft), and social withdrawal in a previously outgoing person may also suggest illicit drug use.

Despite diligent efforts, obtaining an accurate history is often not possible in an acute setting. Additional information can be obtained from a review of the patient's chart, a survey of his or her belongings, interviews with the patient's family and friends, and police reports. A thorough physical examination is essential (table 2). Laboratory studies should include urine toxicology screening; complete blood cell count with differential; measurement of electrolyte, serum urea nitrogen, creatinine, liver enzyme, and thyroid hormone levels; serologic tests for hepatitis, venereal disease, and HIV; tuberculin skin test; chest radiograph; and electrocardiogram. If needed, tetanus immunization should be updated.

Table 2. Physical findings suggestive of illicit drug abuse

Vital signs
Persistently abnormal results on routine testing

Skin
Multiple injection marks ("tracks") along veins on forearm, wrist, dorsum of hand, antecubital area, and ankle

Abscesses due to intravenous or subcutaneous needle use ("skin popping")

Jaundice (hepatitis)

Rash (secondary syphilis)

Excoriations from compulsive picking at "bugs" (formication syndrome) (stimulant abuse)

Lymphadenopathy (injecting drug use)

Head, eyes, ears, nose, and throat
Head trauma from falls or assaults

Pinpoint pupils (opiate abuse)

Dilated pupils (opiate withdrawal or stimulant abuse)

Nystagmus (phencyclidine and sedative abuse)

Red, congested conjunctiva (marijuana intoxication)

Jaundice (hepatitis)

Sinusitis, nasal ulcerations or perforations (cocaine insufflation)

Chest

Chronic cough (marijuana abuse)

Bronchospasm, pneumopericardium, pneumomediastinum (crack cocaine abuse)

Cardiac
Ectopic rhythm, tachycardia (stimulant intoxication)

Murmur (endocarditis)

Abdominal
Hyperactivity (opiate withdrawal)

Liver tenderness

Extremities
Edema, venous insufficiency (injecting drug use)

Neurologic
Changes in mental state

Ataxia

Hyperreflexia

Often the severity of an addiction and potential comorbid psychiatric or medical problems are overlooked or not properly addressed. Subtle behaviors and changes in mental state may suggest potentially catastrophic medical conditions, including withdrawal syndromes and acute intoxication. The following signs necessitate continuous evaluation and monitoring for possible drug abuse and should not be mistaken for manifestations of a primary psychiatric illness (11):

- Fluctuating levels of consciousness: loss of orientation and fluctuations in awareness occurring over minutes to hours
- Disorders of attention: losing track of conversations, falling asleep, and focusing attention on unclear stimuli
- Agitation, picking behavior, aimless grooming and rearranging of items: behaviors that seem to be performed automatically and are not responsive to behavioral interventions or redirection
- Visual and tactile hallucinations: Psychotic symptoms in patients with a primary psychiatric disorder are likely to include bizarre, complicated delusions; paranoid thoughts; and auditory hallucinations. In contrast, drug-induced hallucinations may be more subtle and involve visual and tactile sensations without accompanying delusions.

- Mistaking the unfamiliar for the familiar: Patients with a primary psychotic disorder may refer to the hospital as the White House and mistake the physician for a Central Intelligence Agency spy. However, patients who have a substance-induced psychosis often refer to the hospital as a familiar place (eg, a neighbor's house) and mistake the physician for an old friend.

When substance abuse is suspected, a routine check of vital signs can quickly confirm the presence of a medical condition related to substance intoxication or withdrawal. A lower-than-normal temperature, an increased or decreased blood pressure, or an abnormal respiratory rate indicates a need for a thorough medical examination (12). Conditions that should be evaluated in all patients, especially those in whom drug abuse is suspected, include delirium tremens, CNS infection, intracranial bleeding, Wernicke-Korsakoff syndrome, hypoxemia, hypoglycemia, endocarditis (in an injecting drug user with a fever), and unreported drug overdose. The mention of suicidal thoughts by a patient with a worsening mental state may be a clue to a concealed overdose (11).

Once life-threatening conditions have been ruled out, initial response to treatment may help to confirm the diagnosis. A substance-related psychosis usually shows remarkable improvement after 1 or 2 days of restorative sleep and pharmacotherapy. In contrast, improvement in psychotic symptoms related to schizophrenia or a depressive illness often takes weeks of optimum treatment (11). However, this does not mean that a drug-induced psychosis or mood disorder should be less aggressively treated than a primary psychosis. In fact, mood effects caused by substance abuse may lead to a more serious suicide attempt than would be expected for the severity of the patient's psychiatric problems (13).

Clues to abuse of selected drug classes

Marijuana and opiates generally produce symptoms of CNS slowing that are consistent with drug intoxication. In contrast, the diverse psychiatric symptoms caused by abuse of stimulants or hallucinogens are more difficult to differentiate from primary psychiatric disorders.

Stimulants
Cocaine and other stimulants (eg, amphetamines) have well-recognized acute and chronic presentations. Acute effects include hyperactivity, disinhibition, and agitation. Patients may present with euphoria, grandiosity, and hypersexual and hypervigilant behaviors. Judgment is impaired, and repetitive behaviors are often noted. High doses can result in psychotic symptoms, most commonly paranoid ideation (14,15). If stimulant abuse is suspected in a patient with possible paranoid schizophrenia, thorough history taking and toxicologic testing are essential. Long-term users present with anxiety and alterations of mood.

Physical findings may include muscle twitches and positional tremor, severe weight loss, nasal bleeding, sinusitis, tachycardia, hypertension, and dilated pupils. Intravenous cocaine use usually causes ecchymoses rather than needle scarring, which is more common with heroin injection.

Abrupt discontinuation of stimulant use typically involves three phases: crash, withdrawal, and extinction. The crash follows a binge and may resemble clinical major depression involving prominent dysphoria, fatigue, hypersomnolence, anxiety, and suicidal thoughts. The withdrawal phase presents as the mirror image of the acute effects: Decreased energy and concentration as well as lack of pleasure and interest in most activities are common. Symptoms can last 18 weeks or longer. Although such symptoms may not meet the criteria for major depression, they are a stark contrast to stimulant-induced highs and can lead to craving and cycles of bingeing (14). Episodes of craving evoked by circumstances and objects that cue conditioned associations to memories of stimulant euphoria may occur for months to years after withdrawal. During the extinction phase, the intensity of these evoked cravings is gradually reduced in patients who remain abstinent.

PCP and other hallucinogens

Abuse of PCP can have a wide range of presentations, depending on the amount consumed and the method of administration. Extremely volatile behavior related to labile moods is common. Users may exhibit stereotypical and often bizarre behaviors, such as posturing, mutism, and staring.

Physical hallmarks include vertical and horizontal nystagmus and hypertension. Other findings may include dilated pupils, absent corneal reflexes, muscle rigidity, hypersalivation, and hyperthermia. High-dose toxicity can resemble neuroleptic malignant syndrome and lead to rhabdomyolysis and acute renal failure. Toxicologic testing for PCP should be done promptly when abuse is suspected.

Hallucinogens other than PCP commonly cause anxiety, emotional lability, feelings of unreality, and visual hallucinations. Reality testing and orientation are usually intact. Panic, delirium, or flashbacks occasionally cause users to seek emergency medical attention. Examination may reveal hyperreflexia, tachycardia, dilated pupils, and diaphoresis.

Summary

Illicit drug abuse continues to become more widespread, especially in teenagers. Therefore, it is important for physicians to recognize the signs and symptoms of abuse in their patients. Drug abuse should be considered in differential diagnosis of many physical and nearly all psychiatric complaints.

An understanding of the pharmacologic mechanisms and adverse effects of illicit drugs can enhance overall care of patients who abuse drugs. The primary classes of drugs of abuse--cannabinoids, opiates, stimulants, hallucinogens, and inhalants--produce clinically diverse presentations. By recognizing these unique signs and symptoms, physicians can differentiate between drug-induced conditions and psychiatric illness.

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Current drug abuse trends in teenagers

The PRIDE Survey, the largest ongoing student drug survey in the United States, is conducted annually to determine the prevalence of use of illicit drugs (marijuana, cocaine, uppers, downers, hallucinogens, and heroin), alcohol, and tobacco in school-aged populations. Its 1998-1999 summary (1) presents results from a database of 138,079 students in 28 states. Trends in annual and monthly drug use are reported for students in junior high (grades 6 through 8) and senior high (grades 9 through 12).

Historically, the prevalence of use of all substances declined for nearly a decade until 1992, when rates began to climb. By 1997, the overall prevalence of annual drug use (ie,

use of an illicit drug at least once in the past year) was more than double the 1992 level. In the 1998-1999 survey, annual drug use fell by 1.6% over the previous year's level, primarily because fewer students reported having tried marijuana in the past year. However, monthly use of cocaine, hallucinogens, and alcohol by senior high students increased slightly. Among all students, the greatest decrease in monthly drug use was detected in cigarette smoking.

Despite the modest downward trend, annual drug use in 1998-1999 was still 27%. Thus, as PRIDE Survey author Thomas J. Gleaton, EdD, concluded, "There has been noticeable progress in the last 2 years, but we are far from a turnaround in reducing teen drug use" (1).

Reference

1. 1998-99 PRIDE Survey. Online. Available at: http://www.prideusa.org. Accessed September 13, 1999

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