Cocaine Abuse and Addiction

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The National Institute on Drug Abuse now considers cocaine the "drug of greatest national public health concern." Lower prices and a new administration route, cocaine smoking, have increased the potential for addiction. An estimated 2 million individuals in the United States may be addicted to cocaine, or four times the number addicted to heroin. Contrary to population representations of the intractable power of cocaine addiction, cocaine dependence is a treatable disorder. The primary care physician must become familiar with signs of dependence and with therapeutic approaches to cocaine abuse, with particular attention to emerging advances in both psychotherapy and pharmacotherapy.

The National Institute on Drug Abuse has called cocaine "the drug of greatest national public health concern," estimating there are 2 million addicts[1]—four times the number of heroin addicts. A new mode of using the drug, specifically smoking "cocaine base," has proven to be as addictive as intravenous injection,[2,3] generating unprecedented popular concern about cocaine.

Cocaine has previously been sold as a water-soluble hydrochloride salt for intranasal (snorting) or intravenous (shooting) use. Cocaine hydrochloride decomposes on smoking, but cocaine base, free of the hydrochloride salt, does not. In the 1970s, users discovered that they could liberate the base with ether or baking soda, producing a very addictive, smokable cocaine called "freebase." Pulmonary exchange absorption of smoked cocaine base is as rapid as intravenous injection. In late 1985 a shift in marketing compounded this unfortunate discovery. Distributors began to sell cocaine in ready-to-smoke form, renamed crack or rock, and in amounts small enough for even the young and impoverished to afford. One or two inhalation quantities could be obtained for as little as $10.

Smoking cocaine had previously required transformation into cocaine base by the end-user, requiring rudimentary chemical abilities, some degree of investment in paraphernalia, and resources (around $300) for an initial amount of cocaine hydrochloride to yield sufficient freebase. Crack has appeared first in some large urban centers in the United States, leading to unprecedented cocaine abuse and treatment-seeking in these urban areas.

An estimated 95% of the 20 to 30 million individuals who have used cocaine have thus far avoided dependence,[1] promoting the illusion that cocaine can be used safely. Two to 4 years usually pass from an initial intranasal exposure to cocaine, followed by decreasing control of use, to ultimate cocaine dependence.[4] Other than in acute toxic overdose, early adverse effects are seldom presented to physicians; as with the amphetamine and methamphetamine abuse prevalent two decades ago, clinicians are not usually aware of cocaine abuse in particular patients until dependence and psychosocial strife have already developed.

ABUSE PATTERNS

Cocaine euphoria is neuropharmacologically and clinically indistinguishable from amphetamine euphoria,[5] but cocaine euphoria, lasting only 15 to 40 minutes, is one fourth as long as amphetamine euphoria. This short-lived effect leads to more frequent readministration.[6,7] Cocaine produces a sense of profound well-being, alertness, and magnified pleasure. Self-confidence abounds and anxieties diminish. Emotions, sexual feelings, and communication are enhanced. Perceptions are intensified.

With repeated cocaine use and higher doses, pharmacologic effects are used as a direct reward rather than as a means toward heightening social or interpersonal enjoyment. Use becomes socially isolated,[7,8] and negative personal and social consequences are ignored. Paradoxically, the number of days per week that cocaine is used often decreases as dependence occurs. A shift to binge use devel-

Submitted, revised, June 9, 1989.

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ops; abusers become unable to cease use until all supplies and money are exhausted, and abusers then frequently go for 1 to 5 days without any cocaine.

During binges, cocaine addicts have no interest in sex, nourishment, sleep, safety, survival, money, morality, loved ones, or responsibilities. Abusers average one to three binges per week, lasting from 8 to 24 hours each.

Such compulsive use is often set off by increased availability of intranasal cocaine (eg, made possible by extra money from a bonus) or by a switch to new modes of administration, specifically smoking (crack and freebase) and intravenous use; these routes all create more rapid, intense highs. The ecstatic highs produce vivid memories and a craving to repeat the cocaine experience.

Casual or recreation use is virtually unknown for the rapid-absorption smoking or intravenous rapid-administration routes.[8] Although a popular misconception has held that intranasal cocaine does not cause addiction, about one half of the abusers seeking treatment are exclusive intranasal users and manifest the same binge abuse pattern.[9]

ABSTINENCE SYMPTOMS

Gawin and Kleber[9] have described a triphasic cocaine abstinence pattern to which physicians should be alert, since patients are most likely to be seen in one of the abstinence phases.

Phase 1: Crash

A "crash" of mood and energy immediately follows a cocaine binge. Cocaine craving, depression, agitation, and anxiety intensify. Within 1 to 4 hours, cocaine craving is replaced by desire for sleep. Sedatives, opiates, anxiolytics, or alcohol may be taken to induce sleep. Prolonged sleep may be punctuated by massive eating episodes. Hypersomnolence can last several days, followed by mood normalization.

Clinical recovery from the crash is, in part, accomplished by sleep, nutrition, and replacement of neurotransmitters depleted by the prior binge. Usual management is nutrition and rest, along with observation for possible suicide. The crash is similar to the acute withdrawal characteristic of the alcohol hangover rather than chronic withdrawal, in that this state is minimally associated with intense cravings for the abused substance.

Crash symptoms resemble neurovegetative symptoms in major depression; therefore, assessments for psychiatric disorders or severity of chronic abstinence symptoms should be delayed until crash symptoms have abated. Generally, sleep normalization and 1 to 3 days of confirmed abstinence assure that acute symptoms associated with this period of acute withdrawal have ended.[9]

Phase 2: Withdrawal

A protracted dysphoric syndrome, including inactivity, listlessness, boredom, and pleasurelessness (anhedonia), emerges 1 to 5 days following the crash. These symptoms are less dramatic than the extreme depression experienced during the crash and were not recognized by early observers. Although such withdrawal symptoms are not so unremitting or severe as those of major mood disorders, this pleasureless existence amplifies stimulant craving and leads to resumption of cocaine use. This withdrawal phase parallels withdrawal from other abused substances, except for the absence of gross physiological changes.

Clinicians observe that anhedonic symptoms abate within 1 to 10 weeks of sustained abstinence. Predisposing psychiatric disorders may prolong and amplify these withdrawal symptoms.

Phase 3: Extinction

For months or even years after resolution of withdrawal, occasional periods of conditioned cocaine craving can occur, lasting only minutes or hours. Conditioned cocaine cravings result from objects or events (cues) that in the past had been paired with cocaine intoxication and that evoke associations in memory with cocaine euphoria. Cues can be specific persons, locations, events, mild alcohol intoxication, interpersonal conflicts, or adverse mood states previously soothed by cocaine, or seeing objects linked to abuse (money, white powder, glass pipes, mirrors, syringes, single-edged razor blades, among many others).[10] If the person does not yield to the craving, the desire will abate; the desire further diminishes on each subsequent exposure and gradually becomes extinct.

PRIMARY CARE PRESENTATIONS

Cocaine abusers seek help from nonspecialists in one of the following conditions: (1) suffering from medical consequences of abuse, (2) acutely intoxicated (both conditions often require astute attention and investigation to determine that cocaine led to the presentation), or (3) during the withdrawal or extinction phases, when patients explicitly request treatment or referral.

Medical Consequences

Literature on the morbidity from chronic cocaine abuse has been recently reviewed.[11] Cocaine is an intense local

vasoconstrictor and local anesthetic that increases both cardiac output and peripheral resistance. Morbidity from increased hemodynamic tone is common. Abusers can have cerebrovascular accidents, aneurysm, transient ischemic attacks, myocardial infarction, angina, and acute gastrointestinal distress. Other emergency conditions, such as seizures, hyperthermia, and arrhythmias, occur in acute overdose and are usually identified as cocaine-induced by history or toxicology screening examinations. Cocaine users are usually young and otherwise healthy. Any atypical, acute symptom that could reflect vascular compromise in a young (under 40 years) individual should suggest cocaine use in the differential diagnosis.

Other complications reflect the administration route. Intravenous drug use can cause thrombosis, hepatitis, acquired immune deficiency syndrome (AIDS) and AIDS-related complex, local sepsis, abscess, angiitis, endocarditis, and septicemia. Cocaine smoking can cause pulmonary dysfunction, which may produce blackish sputum discharge and misleading concern over cigarette smoking. Intranasal use can be associated with rhinitis and mucosal inflammation and excoriation, and patients often request strong, locally applied sympathomimetics to relieve chronic cocaine-induced rhinitis.

Acute Intoxication

Cocaine abusers often seek help when concerned about an acute adverse cocaine effect. Observation is essential, as intoxication can evolve into a medical emergency if the cocaine administration was recent. Abusers will seek help at the urging of others, because of acute euphoric disinhibition, or with panic anxiety attacks and often unwarranted concerns about overdose. Transient paranoid, delusional psychoses also can occur during extended cocaine binges and are distinguished from paranoid schizophrenia only by their rapidly resolving course of symptoms over time. Acute depression following cocaine use has previously been noted.[9] Hence, multiple psychiatric disorders, including manic, depressed, paranoid and acute anxiety disorders, may all be mimicked by cocaine abuse. Rapidly remitting (within hours or after sleep) psychiatric symptoms in previously well individuals should raise suspicion of cocaine use.

Requesting Treatment

Dyscontrol of cocaine use often leads to abrogation of responsibility and extreme economic expense. Unreliability and unaccounted-for funds are often first detected by a spouse or parent, who elicits admissions of cocaine use and threatens adverse consequences unless treatment is sought. While many cocaine abusers appearing for treatment do realize that help to cease use is needed, the physician should not consider that a direct plea for treatment indicates the user is truly motivated and will comply fully with treatment efforts. Although it is possible for primary care physicians to provide excellent substance-abuse treatment, such treatment should not be attempted without specific training and expertise. Since such expertise is usually lacking, referral, when possible, is optimal.

Whether to choose inpatient or outpatient treatment is controversial. While inpatient treatment provides a temporary respite to concerned others and to the concerned physician, cocaine produces no withdrawal syndrome demanding inpatient care. An emerging consensus is that less-restrictive outpatient treatment is often successful and should, except in extreme cases, be proven ineffective before hospitalization is used.

COCAINE ABUSE TREATMENT

Cocaine abuse treatment is usually generalized substance abuse treatment, modeled after alcohol or opiate abuse treatment without provision for the specific problems of cocaine abuse, such as anhedonia or conditioned craving.

Recent data from a variety of treatment programs using different therapeutic approaches indicate that outpatient treatment is regularly successful for 50% to 90% of abusers who remain in treatment. No clear evidence indicates that any one treatment approach is superior. Despite differences, all try to surmount the obstacles of the withdrawal and extinction phases of abstinence.

The first treatment goal is breaking cycles of recurrent stimulant binges or daily use. Relapse is likely if the anhedonia is ignored. Focused activity, including individual and family treatment as well as frequent peer-group support, attempts to balance the urge toward anhedonic passivity. External controls and support employed at this time to keep the user from cocaine include spending free time with non-drug-using friends and family, changing the user's telephone number or location, stopping debt payments to dealers to eliminate supply, and giving up all control over personal funds. As withdrawal symptoms diminish, treatment attempts are made to supplement and replace external controls with the patient's own internal controls. The ex-abusers slowly become more autonomous.

If abstinence is not achieved, additional interventions can be employed. First, hospitalization prevents access to cocaine, eliminates temptation, and provides a support system. Length of hospitalization should assure abstinence through the withdrawal phase. Second, pharmacologic adjuncts to treatment are being increasingly employed. These emerging treatments are currently experimental and not yet approved for routine use.

In an initial, open-label clinical trial, desipramine hydrochloride, which is effectively used as an antidepressant and antipanic anxiety agent, produced abstinence in 92%, compared with fewer than 50% in comparison groups who were given other agents (lithium and methylphenidate) or continued in psychotherapy without medication.[12–14] These patients were psychotherapy-resistant, outpatient cocaine abusers who did not have clinical depression. Long-term desipramine use appears to reverse anhedonia in cocaine abusers and also has neurophysiological effects opposite to those of chronic cocaine use shown in animal studies[12]; short-term desipramine courses,[15] which do not produce the neurophysiological changes of longer courses,[15] did not facilitate abstinence.[16]

Promising results occurred in an independent, simultaneous open trial in an unselected population using a closely related agent, imipramine.[17] Double-blind, placebo-controlled studies by two groups have recently confirmed that desipramine substantially increases abstinence rates[18] and decreases cocaine use, craving, and symptom scores.[18,19] The first double-blind report on desipramine effects on cocaine has just been completed, demonstrating initial abstinence in 57% of a desipramine treatment group, compared with 25% and 17% in groups treated, respectively, with lithium and placebo. These findings remain tentative, however; too few subjects ($n < 30$ in each study) have yet been evaluated to reach definitive conclusions. Other experimental pharmacologic research strategies also show promise and are in preliminary stages of investigation.[20]

Once abstinence is sustained, treatment focuses increasingly on strategies to prevent relapse. These strategies include (1) predicting high-risk relapse situations and rehearsing avoidance strategies, evoking memories of cocaine's negative consequences as needed to counteract memories of drug euphoria, (2) reducing external stress, (3) altering lifestyles to develop drug-free socializing, and (4) extinguishing conditioned cues. Idiosyncratic needs in the addict's life that cocaine may have met, albeit dysfunctionally, are explored and constructive alternatives are pursued.[20]

These strategies, in wide use for all substance abusers, were first elaborated by Marlatt and Gordon[21] for nicotine and alcohol abuse. They do not differ for cocaine abusers, except in that cocaine abuse treatment increases emphasis on conditioned cues and their extinction, as follows[10]:

Initially, in the first weeks of treatment, cues are entirely avoided. They are then reintroduced psychologically, in imagery and discussion, in the context of developing strategies for managing temptation. Then, directed, slowly increasing autonomy provides controlled reimmersion in the cue-rich environment to produce gradual extinction without relapse. Finally, successful abstinence is reinforced with maintenance therapies (continuous self-help and after-care groups, resumptions of treatment) to counteract episodic craving. These steps are most often modeled on self-help support groups such as Alcoholics Anonymous. Individual, family or couples therapy, or behavioral contracts with deprivation of desired objects or activities (chosen by consensus early in treatment) as therapeutic "punishment" for subsequent lapses are also employed.

Psychotherapy for cocaine abuse has been based on clinical consensus rather than on precise clinical studies such as those underway for cocaine-abuse pharmacotherapy. Psychotherapy research is also now beginning with studies attempting to isolate the ingredients of successful cocaine abuse psychotherapy and determine indicators for inpatient vs outpatient treatment. Combined with the pharmacotherapy studies, this psychotherapy research promises a scientifically derived future armamentarium for combating cocaine dependence.

Acknowledgment

This paper was supported by grant No. P50-04060 from the National Institute on Drug Abuse.

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