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Characteristics of Freebase Cocaine Psychosis

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Psychosis was present in 29 percent of cocaine-disordered patients hospitalized in 1985 during an epidemic of freebase cocaine abuse in the Bahamas. Record reviews revealed that a variety of psychotic phenomenologic patterns were present. Prior major mental disorders and increased dosage of cocaine were more common among psychotic than non-psychotic patients. Violent behavior was common among cocaine patients, especially those with psychosis. We conclude that freebase cocaine psychosis is neither rare nor benign.

INTRODUCTION

Cocaine psychosis has been unusual, although case reports have documented its sporadic occurrence. Cocaine hydrochloride, the form of cocaine that is snorted or used intravenously, has been implicated in most of these psychotic reactions. For years, however, even researchers on cocaine reported seeing few cases [1]. In the mid-1970s, cocaine sulfate or coca paste smoking led to an increase in psychiatric presentations in South America [2]. Observations of psychoses induced by freebase cocaine have also begun to appear [3,4]. Two general forms of cocaine psychosis have been described: (1) confusional psychoses associated with acute high doses, and (2) insidious onset psychoses (with affective, paranoid, or schizophreniform pictures) associated with chronic heavy use.

FREEBASE EPIDEMIC

A recent nationwide epidemic of freebase cocaine abuse (the virtually pure cocaine alkaloid) in the Bahamas has dramatically changed the perception that cocaine psychosis is uncommon [4,5]. Ninety-eight percent of the hospital admissions for cocaine have been freebase users, and in 1984, for example, such cases represented 34 percent of all psychiatric admissions [5]. While a variety of psychiatric conditions has occurred in this epidemic, psychotic disorders have been common. The frequency and characteristics of these psychoses are the subjects of this report.

The dangers associated with freebase abuse, including its potential to cause psychosis, are considered to be related to its central nervous system (CNS) stimulant properties, bioavailability [6], market availability, and increasingly lower cost [5].

Extracted from cocaine hydrochloride through the use of various solvents, the pure crystalline alkaloid, called "rock," is smoked ("freebasing"). The smoker experiences a pronounced euphoric response within seconds of inhalation. This response eventually becomes associated with an equally profound "crash" marked by dysphoria, apprehension, and anhedonia. Users frequently ingest alcohol and other drugs or take additional cocaine hits to counteract these unwanted effects. Contrary to widely held views that minimize cocaine's addiction potential, the freebase user frequently continues a repetitive pattern of cocaine administration similar to that associated with other addicting drugs [7].

This report presents data collected on the frequency and features of freebase psychosis in a hospitalized sample of cocaine-disordered patients. It also attempts to compare characteristics of those who develop psychotic reactions to cocaine to those who do not. Little data on freebase psychosis exists; however, the following hypotheses, based on observations of CNS stimulant drug-induced psychosis, were used to guide our comparisons of these two groups: (1) evidence of prior mental illness would be concentrated among patients with psychosis; (2) drug use characteristics (e.g., dose, frequency, and duration of cocaine abuse, and concurrent drug abuse) would be higher among the psychotics; (3) violent behavior would be greater among the psychotics [8,9,10].

METHODS

We conducted a case record study at Sandilands Rehabilitation Centre, a 300-bed government hospital on New Providence Island in the Commonwealth of the Bahamas, and the nation's only psychiatric facility. The hospital receives voluntary and involuntary patients who cannot be adequately managed as outpatients. The medical records staff at Sandilands provided case records of all patients discharged during 1985 bearing diagnoses of cocaine disorders (defined as a primary diagnosis of cocaine psychosis or cocaine abuse, and in most cases confirmed by cocaine-positive urine). We examined the case records of 106 consecutively discharged patients—representing one-third of the 1985 hospitalized cases of cocaine disorders (time and staffing resources would not permit review of all patients with cocaine disorders). An initial screening of these records provided demographics, history of prior psychotic symptoms, and ratings for evidence of psychosis on admission and/or during hospitalization. Rated psychotic symptoms included delusions, hallucinations, formal thought disorder, confusion/disorientation, and bizarre or unusual behavior. The unequivocal presence of at least one of these symptoms 24 hours or more after last drug ingestion was required to designate the case as a cocaine psychotic disorder. This criterion was selected because Sandilands is a referral center for emergency rooms, courts, and general practitioners for all of the Bahamas. Generally, patients are admitted at least several hours (and usually much longer) after initial presentation. Therefore, the criterion also provided a conservative case definition through the elimination of individuals in whom the psychotic features were transient (related to acute doses). Although reports of transient symptoms occurring during intoxication were recorded, they were not permitted to enter into the judgment that psychosis was or was not present.

Two subgroups were established from the total sample we examined: patients with cocaine disorders who showed evidence of psychotic symptoms (31) and those who did not (75). A subgroup of the latter (28) with age, sex, and education characteristics

TABLE 1
Demographic Characteristics for Psychotic and Non-Psychotic Samples

Group	<i>n</i> (%)	Age (SD)	Sex (F/M)	Education in Years (SD)
Psychotics	31 (29.2)	29.6 (6.0)	3/28	11.3 (2.5)
Non-psychotics	75 (70.8)	26.5 (5.6)	17/58	11.6 (1.7)
Total	106 (100)	27.2 (5.8)	20/86	11.3 (1.9)

similar to the psychotic group was selected for comparison. The review utilized a data abstraction instrument covering demographics, medical and psychiatric history, family history, cocaine and other drug history, evidence of impairment in work, school, and interpersonal relations, presence of psychosis, onset, duration, and nature of the psychosis, occurrence and nature of violent behavior, medical status, and hospital course. We characterized psychopathologic features by rating the presence and severity of delusions, and disturbances in perception, thought, motor behavior, and affective changes. When present, psychotic disorders were classified according to the predominant pattern of phenomenologic features. Where there was no dominant pattern, the designation of mixed features psychosis was assigned. Violent behavior was defined to include serious threats and/or occurrence of destructiveness toward other persons, self, or property. Inter-rater agreement, assessed on ratings of a subsample (10 percent) of the records, ranged from 0.85–1.0 for rated items.

All patients, psychotic and non-psychotic, had used freebase as their principal drug. Our method of estimating cocaine dosage involved determining dollars spent on the freebase and was based on the assumption (supported by users) that the price of cocaine was similar throughout the Bahamas and did not vary much during 1984–85.

RESULTS

The demographic characteristics from the 106 patient records are presented in Table 1. The ratio of voluntary to involuntary patients was comparable to the overall hospital patient population. We first present analyses of characteristics within the psychotic group. We then compare the matched psychotic and non-psychotic groups.

FREQUENCY AND FEATURES OF COCAINE PSYCHOSIS

The thirty-one patients (29.2 percent) who exhibited psychotic symptoms on admission and during hospitalization comprised the psychotic patient subgroup. Onset of psychosis was acute in 55 percent of these, gradual in 29 percent, and unclear in 16 percent. The mean duration of psychosis was 16 days (SD 18, range 1–60 days). An additional 12 patients (16 percent) of the non-psychotic subgroup had prior evidence of transient psychotic symptoms associated with cocaine intoxication; however, these 12 were not included among the psychotics in our analyses.

Features of psychosis identified among the psychotic patients encompassed each of the major dimensions of psychotic experience, delusions being the most frequent manifestation (93 percent) (refer to Table 5). Ten (32 percent) had evidence of one or more Schneiderian first-rank symptoms, the most common being audible thoughts and voices arguing or commenting on patient's actions. Formication, a symptom traditionally associated with cocaine, was reported in 23 percent (7) of the psychotic patients

TABLE 2
Phenomenologic Patterns of Cocaine Psychosis among 1985 Sampled Admissions

Patients with Previous Mental Illness		Patients without Previous Mental Illness	
Confusional	3	Confusional with depression	5
		Confusional without depression	5
Schizophreniform	3	Schizophreniform	3
Schizoaffective (depressed)	1	Schizoaffective (depressed)	2
Manic	1	Paranoid	3
		Mixed features	4
		Hallucinosiis	1
Total	8	Total	23

compared to none in the non-psychotic group. The phenomenologic patterns are presented in Table 2.

Confusional Psychosis

Extensive comparisons were made between those psychotic patients with ($n = 13$, 42 percent) and without confusion. The confused had used cocaine more frequently (daily, 62 percent vs. 44 percent). They were also more often violent (69 percent vs. 28 percent), and reported more visual (69 percent vs. 28 percent) and auditory (69 percent vs. 30 percent) hallucinations than non-confused psychotics. The duration of psychosis was, however, significantly shorter ($t = 4.54$; $p < .001$) for the confused (mean = 9, SD = 10 days) than for the non-confused (mean = 21, SD = 21.6 days). The two psychotic groups did not differ significantly in age, sex, concurrent drug use, other symptomatology, or previous history of psychiatric illness, including drug-induced psychosis.

Psychosis and Prior Major Mental Illness

We divided the psychotic group into those cases with and without prior history of major psychiatric illness. Of the psychotics with prior psychiatric illness (six, schizophrenic; one, schizoaffective; one, manic-depressive), five also had prior diagnoses of drug-induced psychosis (two marijuana; two cocaine; one cocaine and marijuana), while only two of the 23 psychotic patients with no previous history of major mental illness had prior diagnoses of drug-induced psychosis (one marijuana; one cocaine). This difference was significant ($t = 3.11$, $p < .01$). The most frequent symptoms seen among psychotics with and without previous major mental illness are presented in Table 3.

Among the eight patients with prior history of major mental disorder, five developed psychotic patterns consistent with the preexisting condition, although the present symptoms were reported as more severe. Three of these patients (all previously diagnosed with schizophrenic disorders) exhibited confusional psychoses. Among those patients without prior history, a similar variety of patterns emerged, including psychoses marked by confusion, schizophreniform, paranoid, and schizoaffective features.

Patients with prior history of major mental disorders had more severe, longer-lasting symptoms of psychosis (mean \pm SD = 25 \pm 21 days vs. 9 \pm 14 days; range 1–60 days vs. 1–47 days), which were frequently refractory to pharmacologic intervention. These

TABLE 3
Ten Most Frequent Specific Symptoms in Cocaine Psychotic Group

Symptom	Previous Psychiatric Hospitalization (<i>n</i> = 8)	No Previous Psychiatric Hospitalization (<i>n</i> = 23)	Total (<i>n</i> = 31)
1. Persecutory delusions	88% (7)	78% (18)	81% (25)
2. Poor insight	88% (7)	78% (18)	81% (25)
3. Insomnia	38% (3)	56% (13)	52% (16)
4. Visual hallucinations	25% (2)	52% (12)	45% (14)
5. Irritability	50% (4)	39% (9)	42% (13)
6. Proneness to violence	38% (3)	44% (10)	42% (13)
7. Low impulse control	38% (3)	39% (9)	39% (12)
8. Uncooperative	50% (4)	30% (7)	36% (11)
9. Blunted affect	50% (4)	30% (7)	36% (11)
10. Schneiderian symptoms ^a	62% (5)	22% (5)	32% (10)

^aSchneiderian symptoms include delusional perceptions, thought alienation, passivity experiences, and specific forms of auditory hallucinations.

patients also had poor outcomes compared to those without prior psychiatric disorders (four were readmitted, one jailed, one unknown; only two continued in outpatient treatment). Of note, these eight patients had used freebase less frequently (13 percent vs. 65 percent daily) for less time (three years vs. four years) than psychotics with no previous history of major mental illness. These characteristics suggest greater vulnerability to cocaine mental disturbance in the previously ill group. Concurrent drug use was similar between the groups, except that more of the eight with prior history of mental illness (25 percent vs. 14 percent) used just marijuana with cocaine. Violent behavior was no more frequent in the psychotics with prior major mental disorder than in those without such disorders. Three cocaine psychotic patients without prior psychiatric disorder were given new diagnoses (two with schizophrenic disorder and one with schizoaffective disorder) following a period of abstinence during hospitalization. These outcomes suggest that cocaine may have precipitated latent psychiatric disorder. In sum, the results indicate that prior major psychiatric disorder represents a risk factor for cocaine psychosis.

PSYCHOTIC AND NON-PSYCHOTIC COMPARISON GROUPS

Demographics and Social Functioning

We compared the 31 psychotic with 28 non-psychotic cocaine patients. Despite matching for age, sex, and education, the psychotic group was significantly less likely to be married (refer to Table 4). On the other hand, we found no differences in employment or other features of social adjustment. Both groups (74 percent vs. 82 percent) were extensively but indistinguishably impaired in their familial, marital, and occupational roles. History of criminal activity (primarily theft), though common, also was not different for the two groups.

Prior Psychiatric Disorders

Strikingly, there was no evidence of major psychiatric illness or drug-induced psychosis in the prior history of those patients with a non-psychotic cocaine disorder.

TABLE 4
Demographics of Psychotic and Non-Psychotic Comparison Groups

Group	n	Age (SD)	Sex %F/%M	Marital Status (%) ^a		Education (SD)
				Married	Unmarried	
Psychotic	31	28.6 (6.0)	10/90	10	90	11.3 (2.5)
Non-psy- chotic	28	26.5 (4.9)	11/89	29	61	11.7 (1.6)

Forty-three percent of the non-psychotics had undergone treatment for drug-related problems (i.e., cocaine and/or alcohol and/or marijuana) other than psychosis. These results support the first hypothesis, namely, that evidence of prior major mental disorder is concentrated among the freebase psychotic patients.

Drug Use

The psychotic patients reported using almost twice the amount of cocaine consumed as the non-psychotics (lifetime dosage measured in dollar values). There was, however, no difference between groups for frequency (most were using daily) or duration of cocaine use (3.5 ± 2.5 years vs. 4.3 ± 2.9 years). Concurrent use of other drugs was comparable for the two groups: alcohol, 23 percent vs. 29 percent; marijuana, 19 percent vs. 4 percent; alcohol and marijuana, 26 percent vs. 29 percent; none of these differences were significant. In sum, we were only able partially to confirm the second hypothesis, that drug use characteristics would distinguish the two groups.

Violent Behavior

A history of cocaine-related violent behavior was present in 55 percent of the psychotic patients and 36 percent of the non-psychotics. Violence was a key feature in the admission presentation for 45 percent of the psychotics, compared to 18 percent of the non-psychotics. During hospitalization, evidence of violent behavior occurred in 36 percent of the psychotics and 11 percent of the non-psychotics. In sum, though not isolated to the psychotic group, violent behavior in that group was greater than in the non-psychotic group, thus supporting our third hypothesis.

Paranoid ideation was present in all the psychotics who were violent. Forty percent of both violent psychotics and non-psychotics also had prior history of paranoid ideation during cocaine intoxication.

Other Observations

In addition to hypothesized differences, we looked for other symptomatic differences between the psychotic and non-psychotic groups: for example, there was a significant concentration of agitation, restlessness, staring, and oddities of motor behavior in the psychotic group (39 percent vs. 4 percent). On the other hand, there were similar frequencies for poor insight, craving, suicidal ideation, and withdrawal behavior for the two groups. The symptom judged as most problematic and not differing significantly between the two groups was poor insight (81 percent vs. 64 percent).

TABLE 5
Dimensions of Cocaine Psychosis

Feature	% (n)
Delusions ^a	93 (29)
Perceptual disturbance (Hallucination) ^a	83 (26)
Disturbed form of thinking	48 (15)
Confusion	42 (13)
Unusual behavior	42 (13)

^aCategories include all forms detected in sample, rather than specific types, as in Table 3.

DISCUSSION

In 1982, there were no cases of cocaine disorder admitted to Sandilands Rehabilitation Centre, and, in years prior to 1982, cocaine psychopathology was rare. Since then, the Bahamian epidemic of freebase cocaine abuse has resulted in numerous medical and psychiatric disorders. None has been as dramatic as the increased occurrence of cocaine psychosis. Our findings indicate that 29.2 percent of patients admitted to the hospital with freebase cocaine disorders suffered from psychotic disorders that persisted days or more following cessation of drug abuse. Our definition of psychotic disorder eliminated many cases in which transient psychotic symptoms occurred during cocaine intoxication. This definition, coupled with our suspicion that clinical records were, if anything, more incomplete during the height of the epidemic, lead us to conclude that our estimates of the frequency and severity of psychosis are conservative.

While there is some evidence of a modest increase in Bahamian cocaine abuse, the major factor contributing to the epidemic pattern of cocaine cases was the relatively rapid switch in market availability from cocaine hydrochloride to freebase [5]. Hence it seems reasonable to conclude that any increase in psychosis due to cocaine is related to freebase toxicity.

The freebase psychoses were notable for several characteristics. Virtually all were marked by delusional features. A number of phenomenologic patterns was evident—among them, delusional disorder, schizophreniform disorder, and mixtures of these, some modified by depression. A striking 42 percent of the psychoses had evidence of confusion. Schneiderian symptoms were also common. Formication, the classic cocaine sign, occurred in 23 percent of the psychotics and is therefore somewhat infrequent, despite its notoriety. Patients with previous major mental disorders tended to exhibit psychoses phenomenologically consistent with the prior condition, albeit with greater severity. In general, the previously reported patterns of acute confusional psychoses and/or insidious onset psychoses without confusion were consistent with our findings.

In comparing the psychotic and non-psychotic groups, we found that prior major mental illness was concentrated in the psychotic group. Most drug use characteristics did not distinguish the psychotic from the non-psychotic group, but psychotic patients used more cocaine (twice as much) in the period prior to admission. Violent behavior before and during hospitalization was concentrated among the psychotics, and in close to half of the psychotic cases incidents of violence precipitated admission. This frequency clearly exceeds the base rate of violent behavior associated with psychotic

admissions in the Bahamas, thus leading us to conclude that the association of cocaine psychosis with violence is not merely coincidence. Interestingly, a history of paranoid features associated with previous periods of cocaine intoxication was the most frequent symptom among non-psychotics who exhibited violent behavior. The association of paranoid features and violent behavior, especially among psychotic, cocaine-disordered patients, is reminiscent of similar characteristics in amphetamine abusers [8,10].

We conclude that psychosis is not an uncommon manifestation of freebase toxicity. A variety of psychotic patterns occur, including confusional, paranoid, affective, schizophreniform, and mixed. Prior major mental disorder is a significant risk factor for new and recurrent cases of cocaine-induced psychosis, but the majority of cases have no prior major psychiatric disorder. Also, increased dose is related to psychosis development. Finally, violent behavior related to cocaine toxicity is especially concentrated among those patients with psychosis. Further investigation and follow-up utilizing a more complete means of measuring cocaine dosage and subject factors (e.g., psychiatric and drug histories) would be helpful in illuminating these associations.

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