

BMJ Best Practice

Cocaine use disorder

Straight to the point of care



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Summary

The majority of people who use cocaine do not have a use disorder. There is an increased risk of dependence (moderate to severe cocaine use disorder) with heavier use and when cocaine is smoked or injected.

Comorbid medical and psychiatric illnesses, as well as other substance use disorders, should be assessed.

Treatment options are limited with drug counseling as the mainstay.

There is no evidence to support the use of antipsychotic agents for cocaine dependence. Antipsychotic agents may cause QT interval prolongation and, when used concomitantly with cocaine, may compound the risk of sudden death.

Chronic cocaine use can lead to scarring of heart tissue and myocardial hypertrophy and other changes collectively known as myocardial remodeling. These changes constitute the substrate for the occurrence of lethal arrhythmias.

Psychosis can be seen in chronic users as an isolated condition or as a feature of "excited delirium", an agitated confusional state associated with potentially lethal hyperthermia.

Definition

Cocaine is a controlled illicit, highly addictive stimulant drug that is usually either insufflated (snorted), injected, or smoked in its freebase form (crack). Cocaine use is normally occasional, with the majority of users not meeting the criteria for cocaine use disorder. The Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5) classifies cocaine use disorder as mild, moderate, or severe defined by the number of symptoms within a 12-month period.^[1]

See also our topic on Cocaine overdose.

Epidemiology

An estimated 20 million people used cocaine in 2019, corresponding to 0.4% of the global population.[4] The output of global cocaine manufacture doubled between 2014 and 2019 to reach an estimated 1784 tons (expressed at 100% purity) in 2019, the highest level ever.[4] The 2013 US survey found that 58% of users in the last year used cocaine less than 12 times, while only 22% used at least 50 times.[5] In 2014, it was estimated that 0.9 million adults in the US had a cocaine use disorder.[6] The Global Burden of Disease Study found that from 1990 to 2016 there was an increased prevalence of cocaine use disorder worldwide from around 4.2 million to 5.8 million people. It increased in both men (40.5%) and women (37.9%), although it was still far less prevalent than alcohol, cannabis, or opioid use disorders.[7]

Cocaine is the second most commonly used illegal stimulant in Europe, and its use is most common in southern and western countries. In the European Union, surveys indicate nearly 2.2 million 15-34 year olds used cocaine in the past year.[8] Although decreases in cocaine use have been reported across Europe in recent years, in 2017 a number of indicators (wastewater monitoring, drug seizures, and price and purity data) suggested that the availability of cocaine may once again be on the rise. Three subgroups have shown a higher prevalence than the general population: youth, socially marginalized groups, or opiate-dependent patients in maintenance treatment who additionally use cocaine.[9] In Germany, cocaine use has been found to be part of predominantly multidrug use behavior and is strongly associated with substance-related disorders.[10]

There is also evidence of increased cocaine use in South America and Oceania.[11] However, many regions and countries consistently fail to report the true extent of cocaine use. In particular, little or no information is available from Africa, the Middle East, or much of Eastern Europe, and the situation is not much better in South America.

It is not yet known how the increasingly widespread availability of novel psychoactive substances will alter cocaine consumption.

Etiology

There is no evidence that a variance in any particular gene predisposes to addiction. Addict genomic studies and twin and family cohort studies suggest that there are genes with allelic variants that do predispose to stimulant dependence.[12] [13] It is also known that dopamine-rich neurons in the shell of the nucleus accumbens are deeply involved in the process of addiction to all drugs, and that numerous polymorphisms can alter dopamine metabolism. Genome-wide association studies have implicated the FAM53B (family with sequence similarity 53, member B) gene and the KCTD20 (potassium channel tetramerization domain) gene in cocaine use and dependence; however, these require replication in independent studies.[14] [15]

Pathophysiology

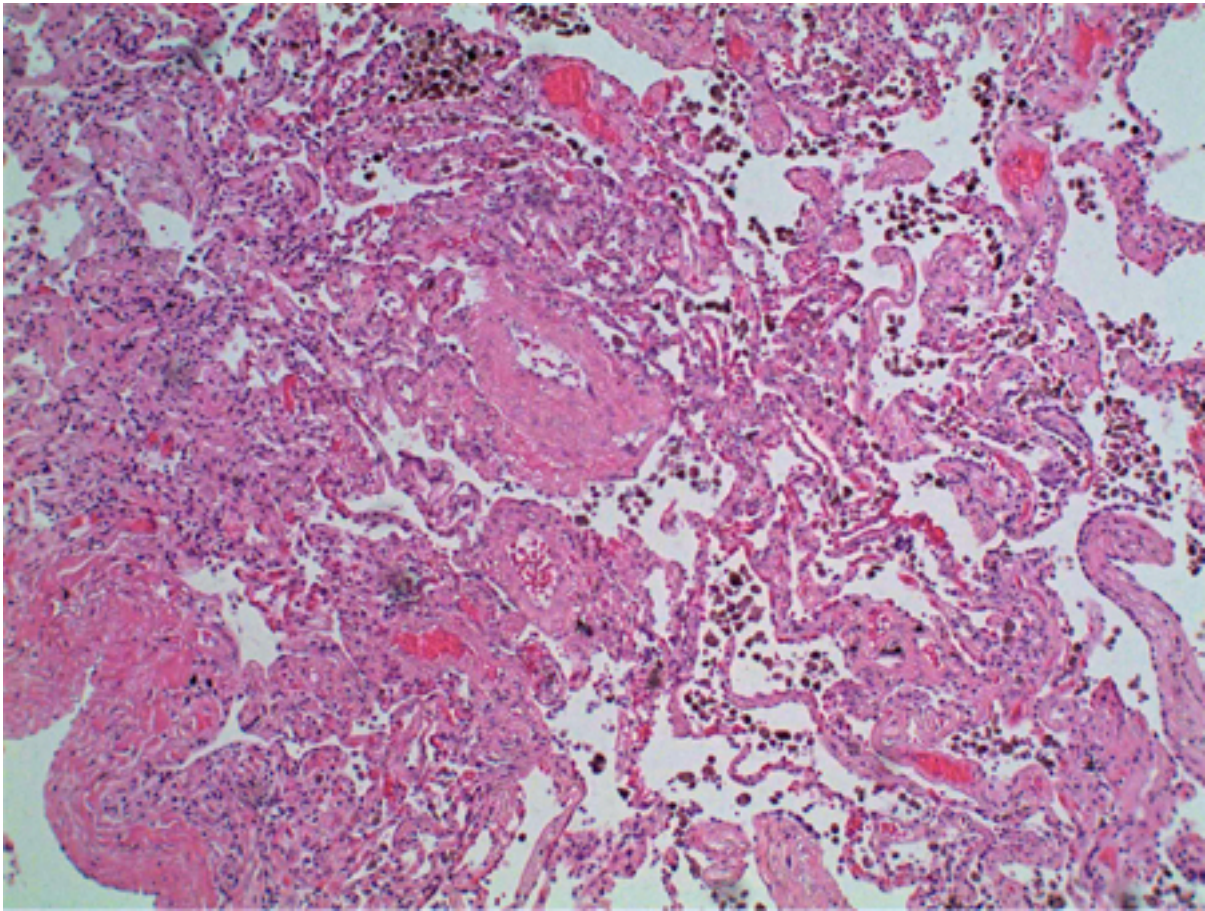
Cocaine exerts multiple effects. Many of these are mediated by prevention of the reuptake of norepinephrine producing a transient hyperadrenergic state. Cocaine prevents the re-uptake of all catecholamines. Unlike other abused drugs, both cocaine and methamphetamine directly activate DNA to produce increased amounts of calmodulin-kinase II. This leads to myocardial hypertrophy and to increased calcium within the cytosol of cardiomyocytes.[16] [17] Both actions favor the occurrence of arrhythmias.[18] Acute elevation of

catecholamines can precipitate acute myocardial infarction in those with underlying coronary disease, and stroke in those with pre-existing cerebral malformations.

Acute toxicity is more or less dose related, but tolerance emerges with the first dose. Chronic use is associated with neurochemical and anatomic changes that can be associated with toxicity, or less commonly with death. Indeed, it is generally accepted that there is no relationship between blood cocaine concentrations measured just before death and levels measured at autopsy, and in neither case is there a relationship between cocaine concentrations and symptoms observed.

For reasons that remain unknown, most cocaine sold today has been adulterated with an old antihelminthic drug called levamisole. Levamisole can cause aplastic anemia, but mainly brings patients to the emergency room because of retiform vasculopathy that may be accompanied by neutropenia, agranulocytosis, thrombotic vasculopathy, and purpura confined to the face and ears.[19] Necrosis of the ear lobes has also been reported. Besides hematologic abnormalities, immunologic testing consistently demonstrates the presence of perinuclear antineutrophil antibodies (p-ANCA). Although tissue necrosis has been reported, patients usually respond promptly to a course of methylprednisolone and antihistamines.

Of much more concern is the recent discovery that humans convert levamisole to aminorex.[20] Chronic ingestion of aminorex may lead to idiopathic pulmonary hypertension (IPH). The conversion rate of levamisole to aminorex in humans has not been established but, given the high daily intake of cocaine reported by many abusers, it seems likely that many of them will have ingested enough levamisole to ultimately cause IPH.[21] Until IPH is well established, symptoms are vague and, short of cardiac catheterization, the diagnosis may be missed entirely. There is no known cure, although drugs are in development for the management of IPH.



Hematoxylin and eosin stained lung section from a 56-year-old male chronic cocaine abuser who died of an apparent arrhythmia. He had been complaining of shortness of breath for several weeks. Note the thickened alveolar septa; medial hyperplasia is obvious in several vessels. The very dark cells scattered among the alveoli are hemosiderin-containing macrophages, a common find in pulmonary hypertension

From the collection of Dr Steven B. Karch; used with permission

Case history

Case history #1

A 28-year-old man presents to an emergency room with anxiety, complaining of a racing pulse and chest pain. He reports a history of 10 pack-years of cigarette smoking. He has snorted cocaine intermittently in the past and recently begun smoking crack cocaine. His symptoms clear during observation, after reassurance and mild sedation.



Crack lip: burns to the lips, caused by hot pipes, are characteristic of crack cocaine smokers

*From: Karch S. Karch's pathology of drug abuse. 4th ed.
Boca Raton, FL: CRC Press; 2008. Used with permission*

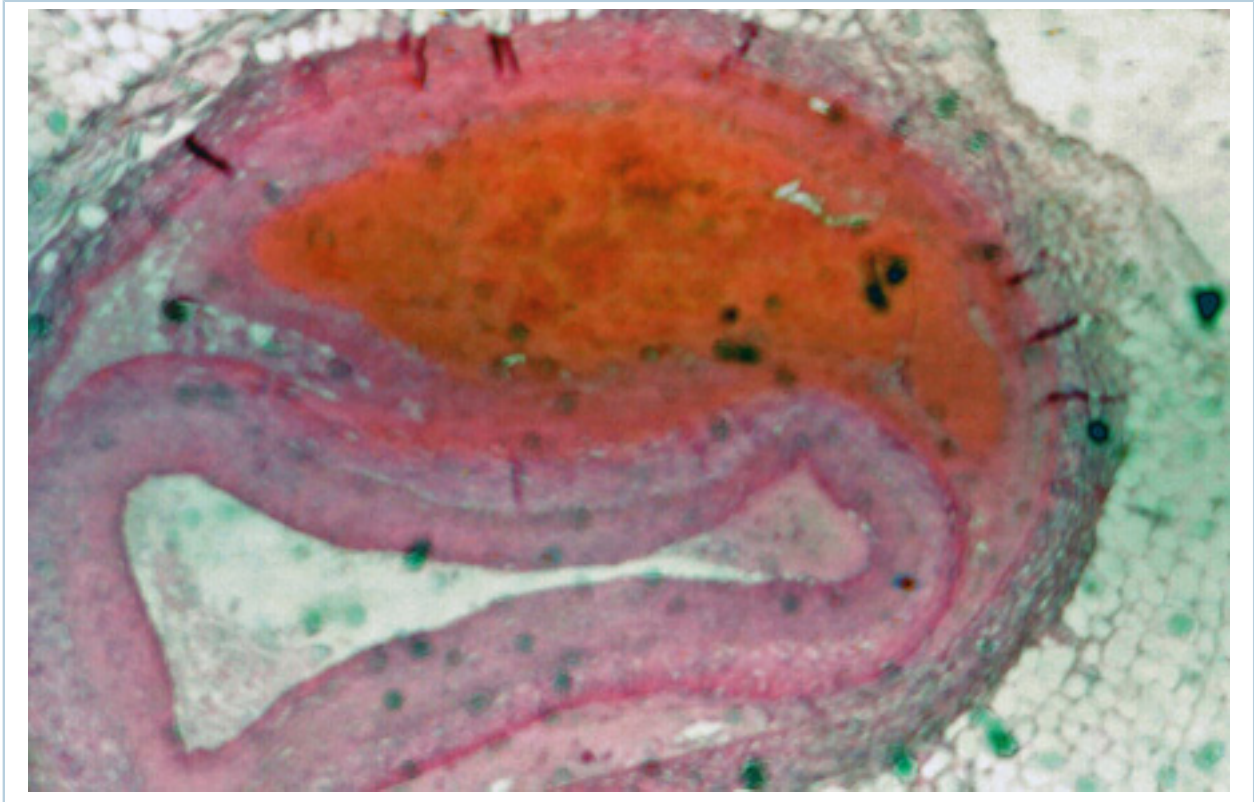
Prior to discharge he is referred for drug counseling.

Case history #2

A 32-year-old man presents to his primary care practitioner complaining of depression. He has snorted cocaine for 10 years and his use has increased over time both in amount and frequency. He has tried to stop but has been unable to without support and he recently lost his job. A urine screen for drugs of misuse is positive for the cocaine metabolite, benzoylecgonine. The patient agrees to participate in a drug treatment program.

Other presentations

Acute myocardial infarction may occur in chronic cocaine users with underlying myocardial pathology and/or coronary artery disease; patients may present to the emergency room complaining of crushing left chest pain. ECG may show S-T changes indicative of acute myocardial infarction, and cataclysmic cardiac events (such as dissection of the left main coronary artery) may occur leading to morbidity and, less commonly, death. Additional, life-threatening complications (e.g., cerebrovascular event or seizure) are also potential consequences of cocaine use. Cocaine contaminated with levamisole has been reported to cause agranulocytosis and ear necrosis, and may also cause internal bleeding.[2] [3]



Coronary dissection: acute myocardial infarction is uncommon in crack cocaine smokers but does occur occasionally. One cause, usually forgotten, is coronary artery dissection

*From: Karch S. Karch's pathology of drug abuse. 4th ed.
Boca Raton, FL: CRC Press; 2008. Used with permission*

Approach

Cocaine abuse can lead to several psychosocial and psychologic sequelae including family disruption, work impairment, financial ruin, violent behavior, extreme mood states, and paranoia. Chronic use can also lead to poor health due to adverse cardiac effects. Cocaine intoxication symptoms may bring a patient to seek medical attention. See also our topic on Cocaine overdose.

The increased use of contaminated cocaine (possibly done to potentiate the effects of cocaine) with levamisole may cause agranulocytosis and other hematologic disorders, skin necrosis, and symptoms consistent with pulmonary hypertension.[2] [3] [25]

Historical factors

Those with personal or family histories of cocaine or other drug abuse (including alcohol abuse) are at higher risk for cocaine use disorders than the general population, as are those with a personal history of mental illness. A history of previous treatment (including detoxification) for drug abuse is an additional marker of increased problem cocaine use risk.

Symptoms

Cocaine use causes a hyperadrenergic state associated with abnormal mentation. The symptoms of hyperadrenergic state are the same regardless of the causative drug or disease; they include nausea, jitteriness, trouble concentrating, anxiety, paranoia, and euphoria. For more, see our topic on Cocaine overdose. A patient may also present with other complications of cocaine abuse such as chest pain, loss of consciousness (as a result of a cocaine-induced seizure), or focal neurologic complaints (e.g., weakness, sensory loss, aphasia, visual field deficit, ataxia) any of which would require emergency investigation and treatment. Chronic use may also result in lung changes causing dyspnea and cough, and gastrointestinal problems; most commonly xerostomia and bruxism.

Withdrawal is usually mild, with symptoms including anxiety, mood swings, insomnia, and cravings for cocaine. Occasionally, "crash" symptoms may occur with severe fatigue and depression.[1]

Physical findings

External markers for chronic cocaine use include crack lip and crack thumb, both being heat-related injuries. Evidence of subcutaneous injection consists mainly of salmon-colored marks on the skin in the early stages and areas of infection and/or skin slough in later stages. The adulterants used in illicit cocaine generally do not induce the venous irritation seen with opiates, and the presence or absence of injection marks should not be considered diagnostic.[26] Other possible findings include nasal septum perforation in those using cocaine intranasally ("snorting"), tachycardia, hypertension, diaphoresis, mydriasis, tremulousness, extreme agitation, irritability/mood lability (even suicidal depression[27]), and focal neurologic complaints (e.g., weakness, altered sensation, difficulty speaking, visual field loss, coordination problems).

Urine toxicology

Urine screening should only be performed when the cause of the hyperadrenergic state is in doubt. It may be of significant value in a younger patient presenting with palpitations or chest pain and without clear cardiac risk factors. The results provided by most screening tests are based on the detection of benzoylecgonine, an inactive metabolite with a much longer half-life than cocaine. Benzoylecgonine is used both clinically and forensically to indicate cocaine use given the short half-life of cocaine.

Whenever a urine screening test is positive for cocaine, it should be followed by a confirmatory test (gas chromatography/mass spectrometry). The presence of levamisole has been identified as an adulterant of cocaine and may aid detection of cocaine use in some circumstances. In the presence of alcohol, cocaethylene may be detected.

Testing for complications

Cocaine-associated chest pain warrants the usual evaluation for chest pain, beginning with ECG and cardiac enzymes. Cocaine use may precipitate acute myocardial infarction in chronic users with underlying myocardial pathology and/or coronary artery disease. Brain imaging and/or electroencephalogram may be warranted if the patient presents with seizures (particularly if recurrent) or focal neurologic symptoms.

History and exam

Key diagnostic factors

presence of cocaine or other substance use disorders in family members (common)

- Drug use by family members (and close friends) contributes to the risk of ongoing drug use by the identified patient.

hypertension (common)

- Adrenergic arousal due to cocaine use.

tachycardia (common)

- Adrenergic arousal due to cocaine use.

chest pain (common)

- Adrenergic arousal due to cocaine use. Acute myocardial infarction is more commonly seen in chronic cocaine users with underlying myocardial pathology and/or coronary artery disease.

mydriasis (common)

- Adrenergic arousal due to cocaine use.

diaphoresis (common)

- Adrenergic arousal due to cocaine use.

tremulousness (common)

- Adrenergic arousal due to cocaine use.

agitation (mild to severe) (common)

- Possible psychomotor activation related to cocaine use.

mood changes (e.g., irritability, euphoria, dysphoria) (common)

- May relate to recent use of cocaine or cocaine abstinence.

Other diagnostic factors

anxiety (panic state: mild to severe) (common)

- Possible adverse cocaine effect.

drug-induced formication (common)

- A tactile hallucination that resembles that of small insects crawling on or under their skin. It may be experienced by psychotic chronic users.

previous hospitalization for detoxification (uncommon)

- Increased cocaine use rates in this population.

suspicious burns (e.g., crack lip, crack thumb) (uncommon)

- Possible signs of traumatic injuries related to smoking crack cocaine.



Crack lip: burns to the lips, caused by hot pipes, are characteristic of crack cocaine smokers

*From: Karch S. Karch's pathology of drug abuse. 4th ed.
Boca Raton, FL: CRC Press; 2008. Used with permission*

nasal septum ulceration, perforation (uncommon)

- Possible sign of intranasal use of cocaine ("snorting").

focal neurologic abnormalities (uncommon)

- Reports or findings of weakness, altered sensation, difficulty speaking, visual field loss, reflex changes, or coordination problems are sequelae of a cocaine-induced cerebrovascular event.

seizure activity (uncommon)

- Cocaine-induced seizure activity is typically isolated, tonic-clonic in nature. If recurrent seizures follow cocaine use episode, investigation of underlying central nervous system pathology would be in order.

loss of consciousness/altered consciousness (uncommon)

- Sequelae of cocaine-induced seizure or cerebrovascular event; may indicate presence of delirium state.

skin lesions (e.g., subcutaneous salmon-colored patches, infections, erosions, necrosis) (uncommon)

- Markers of injection (subcutaneous, intravenous) drug use.

dyspnea (uncommon)

- Cocaine contaminated with levamisole is very weakly associated with an increased risk of pulmonary hypertension.[2]

Risk factors

Strong

history of alcohol/other drug abuse

- Patients who primarily abuse alcohol or other substances have increased rates of using cocaine.

history of mental illness

- Patients with psychiatric illness have increased rates of cocaine (and other substance) use.

Weak

male sex

- In the 2016 US survey, the rate of current illicit drug use among people ages 12 years or older was higher for males (12.8%) than for females (8.5%). Males were more likely than females to be current users of several different illicit drugs including cocaine (1.0% vs. 0.4%).[22] However, there is some evidence that female inner-city substance users are more likely to use cocaine than any other drug, and that they may be more likely to develop dependence compared with their male counterparts.[23]

Investigations

1st test to order

Test	Result
<p>urine toxicology ± gas chromatography/mass spectrometry testing for levamisole</p> <ul style="list-style-type: none"> Particularly indicated in patients with chest pain of unexplained etiology or when there is clinical suspicion of substance misuse as either a cause or a contributor to an acute coronary syndrome, especially in younger patients (age <50 years).[28] Levamisole is now almost a universal cocaine adulterant.[29] Whenever a urine screening test is positive for cocaine, it should be followed by additional screening (gas chromatography/mass spectrometry) for the presence of levamisole, as urine screening tests do not react with levamisole or its metabolite. Blood testing for cocaine or its metabolites is typically not indicated, as symptoms do not correlate with plasma concentrations.[30] May reveal presence of additional drugs. 	<p>positive for cocaine or metabolites (benzoylecgonine)</p>
<p>ECG</p> <ul style="list-style-type: none"> Indicated in patients with chest pain and/or dangerous blood pressure elevation.[31] Patients who have used cocaine may present with chest pain even in the absence of clear cardiac risk factors. Cocaine-related ECG changes are results of vasoconstrictive effects of cocaine and/or sodium and potassium channel blockade. In some cases, Brugada-pattern ECG findings may be present. The Brugada syndrome is a genetic disease predisposing to life-threatening ventricular tachyarrhythmia and sudden cardiac death.[32] 	<p>nonspecific T-wave changes or signs of frank infarction with/without rhythm disturbance; or widened QRS/QT prolongation/torsades de pointes; Brugada pattern may be present</p>
<p>chest x-ray</p> <ul style="list-style-type: none"> Indicated for patients presenting with chest pain and/or dyspnea. Pneumothorax and pneumomediastinum are rare complications of cocaine use. They are probably related to the practice of some cocaine users to perform a Valsalva maneuver following insufflation or inhalation, not a direct effect of the drug itself. A hemorrhagic alveolitis (crack lung) rarely occurs but is well described in the literature. 	<p>atelectasis, pneumothorax, pneumomediastinum, focal consolidation, or diffuse parenchymal ground glass (hemorrhagic alveolitis)</p>
<p>CT head</p> <ul style="list-style-type: none"> Indicated for patients demonstrating focal neurologic symptoms. 	<p>evidence of ischemic event or bleed associated with focal neurologic signs/symptoms</p>
<p>electroencephalogram</p> <ul style="list-style-type: none"> Indicated for patients demonstrating seizure activity, particularly those with recurrent seizures post-cocaine use. 	<p>generalized (as opposed to focal) seizure pattern is typical of cocaine-induced seizures</p>

Other tests to consider

Test	Result
CBC <ul style="list-style-type: none"> The cocaine contaminant levamisole has been associated with agranulocytosis.[2] [25] 	decreased WBC count
CT chest <ul style="list-style-type: none"> A high resolution CT chest is indicated in patients with dyspnea and abnormal findings on chest x-ray. 	interlobular septal thickening, peribronchial nodules, ground glass opacities
bronchoalveolar lavage <ul style="list-style-type: none"> May be useful in patients with suspected crack lung. 	carbonaceous debris, eosinophils, Charcot-Leyden crystals, hemosiderin-laden macrophages, increased cell counts
transthoracic echocardiogram <ul style="list-style-type: none"> Screening test for suspected cardiomyopathy or pulmonary hypertension. 	tricuspid regurgitation; right ventricular and right atrial dilation; pericardial effusion

Differentials

Condition	Differentiating signs / symptoms	Differentiating tests
Thyrotoxicosis	<ul style="list-style-type: none"> Weight loss may be prominent. May be suggestive findings on physical examination of the thyroid, such as tenderness to palpation, goiter, and thyroid bruit. 	<ul style="list-style-type: none"> Elevated thyroxine, suppressed thyroid-stimulating hormone.
Methamphetamine abuse	<ul style="list-style-type: none"> Reported history of methamphetamine use. Significant dental erosion and skin ulcerations/other skin lesions from scratching and picking may be present. 	<ul style="list-style-type: none"> Urine toxicology screening positive for methamphetamine.[33]
Amphetamine abuse	<ul style="list-style-type: none"> Medical and psychiatric adverse effects may be longer-lived (days to weeks) than those due to cocaine (typically lasting hours to 2-3 days) due to longer half-life of amphetamines versus cocaine. 	<ul style="list-style-type: none"> Urine toxicology screening positive for amphetamine.[33]
Ephedrine abuse	<ul style="list-style-type: none"> Reported history of ephedrine use. Significant weight loss may be evident. Alternatively, there may be evidence of particular attention to physique/muscle development. 	<ul style="list-style-type: none"> Urine toxicology screening positive for ephedrine.[34]
Mood disorder	<ul style="list-style-type: none"> Can be difficult to distinguish clinically and may be comorbid. Somatic symptoms, such as insomnia, weight loss, or psychomotor agitation may be more prominent. 	<ul style="list-style-type: none"> Clinical interview. Use of Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5) criteria.[1] The Primary Care Evaluation of Mental Disorders (PRIME-MD) may indicate presence of symptoms suggestive of mood disorders.[35] The Mood Disorder Questionnaire may indicate presence of symptoms indicative of elevated mood states (hypomania and mania).[36] Urine toxicology screening is negative for cocaine or metabolites, unless there is concomitant cocaine use.

Condition	Differentiating signs / symptoms	Differentiating tests
Psychotic/paranoid disorder	<ul style="list-style-type: none"> History positive for similar states unrelated to episodes of cocaine use. 	<ul style="list-style-type: none"> Urine toxicology screening is negative for cocaine or metabolites, unless there is concomitant cocaine use.
Personality disorder	<ul style="list-style-type: none"> Patients with borderline personality disorder may experience transient paranoid ideation in response to stress; patients with schizotypal personality disorder may experience ideas of reference (but not delusions), as well as odd beliefs or magical thinking. May be a comorbid condition. 	<ul style="list-style-type: none"> Clinical interview. Use of Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5) criteria.[1] Urine toxicology screening is negative for cocaine or metabolites, unless there is concomitant cocaine use.
Synthetic cannabinoid/cathinone derivatives abuse	<ul style="list-style-type: none"> May exert the same symptoms as cocaine intoxication: e.g., excited delirium (psychotic hyperarousal, hyperthermia, cardiac arrest) or hyperadrenergic syndrome. 	<ul style="list-style-type: none"> Patient history of drug use is key. Not detected by normal urine toxicology screening, so should be suspected (along with psychosis) if a patient with suggestive symptoms and signs tests negative for cocaine and methamphetamine use. Detectable using time of flight spectroscopy, only available in selected large tertiary centers. Results are available after at least 24 hours (too slow to be of clinical value). The distinction is largely academic and treatment should be given for excited delirium or hyper-adrenergic syndrome (if present) as described in this topic. There are currently no commercial kits or devices for the routine screening of these drugs.[37] [38] [39]

Criteria

Diagnostic and statistical manual of mental disorders, fifth edition (DSM-5)[1]

Cocaine use disorder is defined as two or more of the following within a 12-month period:

- Using larger amounts of cocaine or over a longer period than was intended

- Persistent desire to cut down or unsuccessful efforts to control use
- Great deal of time spent obtaining, using, or recovering from use
- Craving, or a strong desire or urge to use substance
- Failure to fulfill major role obligations at work, school, or home due to recurrent cocaine use
- Continued use despite recurrent or persistent social or interpersonal problems caused or exacerbated by cocaine use
- Giving up or reducing social, occupational, or recreational activities due to cocaine use
- Recurrent cocaine use in physically hazardous situations
- Continued cocaine use despite physical or psychologic problems caused or exacerbated by its use
- Tolerance (marked increase in amount; marked decrease in effect)
- Withdrawal syndrome as manifested by cessation of cocaine or use of cocaine (or a closely related substance) to relieve or avoid withdrawal symptoms.

Severity of cocaine use disorder is categorized as mild (presence of 2-3 symptoms), moderate (4-5 symptoms), or severe (6 or more symptoms). It should be specified if the individual is in an environment where access to cocaine is restricted.

Remission of cocaine use disorder is categorized as:

- In early remission: where none of the criteria for cocaine use disorder have been met for at least 3 months but for less than 12 months (with the exception of craving, or a strong desire or urge to use cocaine), but full criteria for cocaine use disorder were previously met.
- In sustained remission: where none of the criteria for cocaine use disorder have been met at any time during a period of 12 months or longer (with the exception of craving, or a strong desire or urge to use cocaine), but full criteria for cocaine use disorder were previously met.

Screening

Healthcare setting

The US Preventive Services Task Force (USPSTF) recommends that clinicians screen for unhealthy drug use in adults 18 years or older, when services for accurate diagnosis, effective treatment, and appropriate care can be offered or referred. Screening in this context refers to asking questions about unhealthy drug use. For adolescents, the USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for unhealthy drug use, meaning that clinicians should use their judgement about screening by asking questions about drug use in adolescents.^[40]

Work setting

There are various point of care tests that are used in the workplace for workplace drug screening. These universally employ immunoassay tests to screen for different drug classes including cocaine. Urine or oral fluid (saliva) testing may occur in the course of employment for those in particular occupations (law enforcement, transportation, military) or as a prerequisite for employment. Whether or not "For Cause" testing is permitted depends largely on union contract stipulations. The results of workplace testing must always be confirmed by additional testing, usually liquid chromatography/tandem mass spectroscopy (LC/MS/MS).

Pregnancy

Healthcare workers should ask women about substance use, including alcohol and tobacco, at all prenatal visits. Self-report screening has been shown to be accurate (compared with urine toxicology) in women using cocaine.[41] The UK National Institute for Health and Care Excellence also recommends discussing recreational drug use during postpartum care if appropriate, and providing information and further care as required.[42] The UK also has what are known as the Orange Guidelines (Drug misuse and dependence guidelines), which cover testing and assessment of drug users in some detail.[43]

Approach

Acute cocaine intoxication

Presenting symptomatology and ongoing regular assessment will dictate the need for specific condition management (e.g., hypertension, tachycardia, chest pain, focal neurologic finding, seizure, significant anxiety/mood/psychotic symptoms), which generally follows the management provided for the identified conditions in the absence of the drug. Mild sedation with a benzodiazepine may provide benefit for many of these symptoms.

For details on the management of acute cocaine intoxication and for information on body-packer syndrome see our topic on Cocaine overdose.

General considerations

Treatment options are limited. There is no agreed drug treatment for cocaine use disorder.[45] [46] [47] For drug problems where there may be no medical-based treatments, like with cocaine, psychosocial interventions are the primary treatment.[43] Distinct withdrawal syndromes with dangerous medical consequences do not occur after abrupt stimulant withdrawal. Some patients may have "crash" symptoms with severe fatigue, depression, and suicidal ideation, but this can normally be managed with psychosocial interventions and medical detoxification is not usually required.

Treatment for cocaine use disorder is the same regardless of whether the drug is snorted or smoked, and patients usually benefit from referral to a drug counselor/drug treatment service.[48] The person's clinical status, severity of cocaine use disorder, and any prior response to treatment should be considered when planning treatment. Contingency management and cognitive behavioral therapy (CBT) have been shown to be the most effective interventions for people with cocaine dependence.[49] The UK National Institute for Health and Care Excellence (NICE) only recommends CBT for people with comorbid depression or anxiety.[50] Family therapy or couples therapy can be considered if the person with cocaine use disorder is amenable to having their partner or family involved in their care.[50] [51] For parents, a psychosocial intervention integrating parenting skills with a substance use component may be helpful.[52] As with other substance use disorders, continuing care, rather than care limited to periods of acute exacerbation, is likely to help reduce recurrent use, especially for people with family or social issues.[53] Mutual support groups such as Narcotics Anonymous or Cocaine Anonymous may be helpful for maintaining abstinence. [Narcotics Anonymous] (<https://na.org>) [Cocaine Anonymous] (<https://ca.org>)

Patients with the presence of significant psychiatric symptoms in the setting of acute cocaine use or a history of pre-existing mental health issues may benefit from mental health referral.

Mild cocaine use disorder

In general, first-line treatment is with individual or group drug counseling, or a combination of these approaches.[54] An educational component is combined with elements of cognitive, behavioral, and/or supportive therapy. Topics such as identifying and avoiding triggers are covered, and ongoing attendance at mutual help groups (such as Narcotics Anonymous) is encouraged. There is very limited evidence available for drug counseling.[50] See also the UK clinical guidelines, which cover psychosocial treatment in detail.[43]

If standard drug counseling fails, intensive outpatient therapy may be an option, although there is insufficient evidence of better outcomes.[55]

After 2 to 3 months of intensive outpatient therapy, if the person requires further treatment, depending on availability and their personal preference, options include augmentation with contingency management, or replacing the individual component of intensive outpatient therapy with CBT or motivational interviewing.

Moderate to severe cocaine use disorder

Intensive outpatient therapy is the first-line treatment and has been shown to be as effective as inpatient or residential programs.[48] [56] [57] Individual and group counseling are often combined with couples/family therapy, with typically more than 9 hours of therapy per week over several weeks. However, there is some evidence that lower intensity treatment (for example 6 hours a week) may be just as effective in patients with a Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) diagnosis of cocaine dependence.[58]

If a patient requires further treatment, options include adding contingency management, CBT, or motivational interviewing.[51]

- Contingency management uses operant behavioral techniques. Examples include voucher-based reinforcement therapy (VBRT), rewarding the achievement of agreed therapeutic goals. Several small randomized controlled trials have shown that the addition of VBRT to standard treatment increases abstinence in people with cocaine use disorder, including people with comorbid opioid use disorder.[49] [50]
- CBT for cocaine use disorder involves recognition of triggers and teaching of coping skills to avoid drug use. Clinical trials in patients with DSM-IV cocaine dependence comparing CBT with control groups (meditation and relaxation training) or other psychosocial interventions have shown mixed results, although there is some evidence that the coping skills taught with CBT may be effective even once treatment has finished.[49] [59] [60]
- People with more severe substance use disorder symptoms or with comorbid depression may be more likely to benefit from CBT.[50] [61]
- Computerized CBT delivered in a clinical setting has been shown to be as effective as traditional CBT in a diverse group of patients with substance use disorders. Computerized CBT was also associated with lower dropout rates.[62]
- Motivational interviewing is a directive, patient-centered counseling approach that aims to help people change problem behaviors. Clinical trials have only found motivational interviewing to be effective compared with no treatment, but not compared with control interventions such as relaxation training.[49] [63]

Treatment-resistant cocaine use disorder

If after up to 12 weeks of the most intensive psychosocial treatment a patient continues to relapse, then consider referring them to an expert in addiction for possible adjunctive medication; however, evidence for this is very limited and there is no established guidance.[47]

Pregnancy

As for anyone with cocaine use disorder, the focus of treatment is on psychosocial interventions, and pharmacotherapy is not recommended for routine treatment of dependence. However, because of the risk of harms of ongoing cocaine use to both the mother and fetus, there is a lower threshold for inpatient withdrawal management, which may include nonteratogenic medications for the short-term management of psychologically distressing symptoms.[41]

Management should be provided by services specializing in substance use in pregnancy. In addition to psychosocial interventions, it is important that appropriate social support is given, including assistance with accommodation, life-skills and vocational training, legal advice, home-visiting, and outreach.[41]

A therapeutic workplace (a form of contingency management with salary in base pay vouchers linked to abstinence) has been shown to be superior to usual care in reducing opioid and cocaine use in pregnant and postpartum women with substance use disorders.[41] [64]

Treatment algorithm overview

Please note that formulations/routes and doses may differ between drug names and brands, drug formularies, or locations. Treatment recommendations are specific to patient groups: [see disclaimer](#)

Acute (summary)		
acute intoxication		
	1st	acute management in emergency department
nonpregnant adults and adolescents: mild cocaine use disorder		
	1st	drug counseling
<ul style="list-style-type: none"> ■ significant mental health issues or prominent psychiatric symptoms 	adjunct	mental health referral
nonpregnant adults and adolescents: moderate to severe cocaine use disorder		
	1st	intensive outpatient therapy
<ul style="list-style-type: none"> ■ significant mental health issues or prominent psychiatric symptoms 	adjunct	mental health referral
pregnant		
	1st	specialist withdrawal management ± inpatient care

Ongoing		(summary)
sustained remission		
	1st	continuing care
	plus	mutual help group
continued use or relapse		
	1st	contingency management
	plus	mutual help group
	2nd	cognitive behavioral therapy or motivational interviewing
	plus	mutual help group
treatment resistant		
	1st	addiction specialist referral

Treatment algorithm

Please note that formulations/routes and doses may differ between drug names and brands, drug formularies, or locations. Treatment recommendations are specific to patient groups: [see disclaimer](#)

Acute

acute intoxication

1st acute management in emergency department

» Specific symptom management (e.g., hypertension, tachycardia, chest pain, focal neurologic finding, seizure, significant anxiety/mood/psychotic symptoms), which generally follows the management provided in the absence of cocaine use. For details on the management of acute cocaine intoxication and for information on body-packer syndrome see our topic on Cocaine overdose.

nonpregnant adults and adolescents: mild cocaine use disorder

nonpregnant adults and adolescents: mild cocaine use disorder

1st drug counseling

» Abrupt stimulant withdrawal typically does not produce dangerous medical consequences, and although dysphoria and other psychiatric symptoms may be significant in the initial period of drug abstinence, pharmacologic treatment is not usually required. Treatment for cocaine use disorder is the same regardless of whether the drug is snorted or smoked, and patients usually benefit from referral to a drug counselor/drug treatment service.[48]

» In general, first-line treatment is with individual or group drug counseling, or a combination of these approaches.[54]

■ **significant mental health issues or prominent psychiatric symptoms**

adjunct mental health referral

Treatment recommended for SOME patients in selected patient group

» Additional referral to mental health services may be a consideration in those with a past history of significant mental health issues or those with a current prominent display of psychiatric symptomatology.

nonpregnant adults and adolescents: moderate to severe cocaine use disorder

nonpregnant adults and adolescents: moderate to severe cocaine use disorder

1st intensive outpatient therapy

» Abrupt stimulant withdrawal typically does not produce dangerous medical consequences, although dysphoria and other psychiatric symptoms may be significant in the initial period of drug abstinence. Selected patients with severe psychiatric symptoms and/or very adverse psychosocial situations (homeless,

Acute

- **significant mental health issues or prominent psychiatric symptoms**

adjunct

residing with active substance users) may benefit from a period of highly structured treatment. Intensive outpatient therapy has been shown to be as effective as inpatient or residential programs.[48] [56] [57]

» Individual and group counseling are often combined with couples/family therapy, with typically more than 9 hours of therapy per week over several weeks. However, there is some evidence that lower intensity treatment (for example 6 hours a week) may be just as effective in patients with a Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) diagnosis of cocaine dependence.[58]

mental health referral

Treatment recommended for SOME patients in selected patient group

» Additional referral to mental health services may be a consideration in those with a past history of significant mental health issues or those with a current prominent display of psychiatric symptomatology.

pregnant

1st**specialist withdrawal management ± inpatient care**

» Where possible, management should be provided by services specializing in substance use in pregnancy. In addition to psychosocial interventions, it is important that appropriate social support is given, including assistance with accommodation, life-skills and vocational training, legal advice, home-visiting, and outreach.[41]

» Because of the risk of harms of ongoing cocaine use to both the mother and fetus, there is a lower threshold for inpatient withdrawal management, which may include nonteratogenic medications for the short-term management of psychologically distressing symptoms.[41]

Ongoing

sustained remission

1st continuing care

» Continuing care with drug counseling or intensive outpatient therapy, rather than care limited to periods of acute exacerbation, is likely to help reduce recurrent use, especially for people with family or social issues.[53]

» People with mild cocaine use disorder may not require continuing care.

plus mutual help group

Treatment recommended for ALL patients in selected patient group

» Patients should be advised to seek support groups such as Narcotics Anonymous or Cocaine Anonymous. [Narcotics Anonymous] (<https://na.org>) [Cocaine Anonymous] (<https://ca.org>)

continued use or relapse

1st contingency management

» Contingency management uses operant behavioral techniques. Examples include voucher-based reinforcement therapy (VBRT), rewarding the achievement of agreed therapeutic goals. Several small randomized controlled trials have shown that the addition of VBRT to standard treatment increases abstinence in people with cocaine use disorder, including people with comorbid opioid use disorder.[49] [50]

» A therapeutic workplace (a form of contingency management with salary in base pay vouchers linked to abstinence) has been shown to be superior to usual care in reducing opioid and cocaine use in pregnant and postpartum women with substance use disorders.[41] [64]

plus mutual help group

Treatment recommended for ALL patients in selected patient group

» Patients should be advised to seek support groups such as Narcotics Anonymous or Cocaine Anonymous. [Narcotics Anonymous] (<https://na.org>) [Cocaine Anonymous] (<https://ca.org>)

2nd cognitive behavioral therapy or motivational interviewing

Ongoing

» Cognitive behavioral therapy (CBT) for cocaine use disorder involves recognition of triggers and teaching of coping skills to avoid drug use. Clinical trials in patients with Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) cocaine dependence comparing CBT with control groups (meditation and relaxation training) or other psychosocial interventions have shown mixed results, although there is some evidence that the coping skills taught with CBT may be effective even once treatment has finished.[49] [59] [60]

» People with more severe substance use disorder symptoms or with comorbid depression may be more likely to benefit from CBT.[50] [61]

» Computerized CBT delivered in a clinical setting has been shown to be as effective as traditional CBT in a diverse group of patients with substance use disorders. Computerized CBT was also associated with lower dropout rates.[62]

» Motivational interviewing is a directive, patient-centered counseling approach that aims to help people change problem behaviors. Clinical trials have only found motivational interviewing to be effective compared with no treatment, but not compared with control interventions such as relaxation training.[49] [63]

plus mutual help group

Treatment recommended for ALL patients in selected patient group

» Patients should be advised to seek support groups such as Narcotics Anonymous or Cocaine Anonymous. [Narcotics Anonymous] (<https://na.org>) [Cocaine Anonymous] (<https://ca.org>)

treatment resistant

1st addiction specialist referral

» If after up to 12 weeks of the most intensive psychosocial treatment a patient continues to relapse, then consider referring them to an expert in addiction for possible adjunctive medication; however, evidence for this is very limited and there is no established guidance.[47]

Emerging

Cocaine vaccine

Studies have shown this to be a safe intervention. In those who respond to the vaccine with high antibody levels, cocaine use is reduced and the effects of cocaine diminished.[65] However, little progress has been made, primarily because the protective effect of the vaccine can be negated by consuming cocaine in greater quantities.

Agonist-like medications

The idea of using agonist-like medications (e.g., amphetamines) for the treatment of cocaine use disorder is similar to that of methadone for opioid use disorder. Earlier studies with long-acting amphetamine or methamphetamine had mixed results.[66] [67] [68] A 2016 randomized controlled trial (n=73) in people with comorbid heroin and cocaine dependence found that the addition of sustained-release oral dextroamphetamine to methadone resulted in fewer days of cocaine use (mean 44.9 days with dextroamphetamine vs. 60.6 days with placebo).[69] Current evidence from randomized controlled trials does not support the use of dopamine agonists for treating cocaine misuse.[70]

Modafinil

Modafinil is a mild stimulant that is thought to possibly block the euphoric effects of cocaine. Results have been mixed, although there is some evidence it may be helpful in people with cocaine use disorder who do not have comorbid alcohol use disorder.[71] [72]

Disulfiram

Usually used in the treatment of alcohol use disorder, disulfiram has been shown to reduce cocaine use, and to be effective in the treatment of comorbid cocaine and alcohol use.[73] [74]

Topiramate

Studies have looked at whether topiramate in addition to psychotherapy improves abstinence from cocaine; however, results are mixed and it may be more effective in people without comorbid alcohol use disorder.[75] [76]

Primary prevention

Public education may discourage individuals or groups from experimenting with cocaine and other illicit drugs.

In 2020, the US Preventive Services Task Force concluded that there was insufficient evidence to assess the use of primary care-based behavioral counseling interventions to prevent illicit drug use in children, adolescents, and young adults.[24]

Secondary prevention

Attendance at support group meetings such as Cocaine Anonymous is strongly encouraged. [Cocaine Anonymous] (<https://ca.org>) It is recommended that substance-using family members and friends should be avoided. Activities that involve responsible actions, health-promoting behaviors, and involvement with others pursuing recovery from addictive illness are suggested.

Because of the risks of cardiovascular disease, people with cocaine use disorder should be advised about changes to diet, physical exercise, weight management, reduction of alcohol consumption, and smoking cessation.

Patient discussions

Physicians should advise patients that there is no safe cocaine dosage, and discuss the dangers of cocaine use. Clinicians should recommend that patients stop using cocaine completely and to avoid the use of other illicit drugs, alcohol, and tobacco products. Patients should be advised to seek support groups such as Narcotics Anonymous or Cocaine Anonymous. [Narcotics Anonymous] (<https://na.org>) [Cocaine Anonymous] (<https://ca.org>)

New mothers need to be advised that cocaine passes into breast milk, and can cause acute intoxication in the infant. They should bottle feed for 24 hours after cocaine use and express and throw away their breast milk during that period. If this is not possible/sustainable then the woman should be advised against breast-feeding.[41]

Monitoring

Monitoring

Follow-up care is best achieved in a drug treatment program. Urine drug screening at random intervals is typically used to monitor for return to drug use. Primary medical care follow-up is indicated for all patients, specialist medical follow-up for those with complicated health conditions, and mental health follow-up for those with suspected or known mental health conditions.

Complications

Complications	Timeframe	Likelihood
cocaine overdose	short term	medium
<p>Medical emergency. Encompasses a variety of medical and psychiatric sequelae as a result of excessive adrenergic activity.</p> <p>Hyperthermia, seizures, and cardiovascular collapse may all occur, necessitating aggressive sedation and medical treatment (cardiovascular agents, anticonvulsants) in a highly monitored setting.</p>		
excited delirium	short term	medium
<p>Medical emergency.</p> <p>Typically seen in chronic users as long-term use causes changes in brain temperature regulation that can lead to fatal hyperthermia. It is considered by some to be a variant of neuroleptic-malignant syndrome.</p> <p>Temperatures may rise above 106°F (41°C), requiring aggressive cooling measures. The biomarkers for this condition include an increase in heat shock protein (HSP) 70 (but not any of the other HSPs) and a decrease in dopamine transporters.[38]</p> <p>Antipsychotic agents are widely used as an adjunct in patients with excited delirium, although there are no studies to document effectiveness. A systematic review found no evidence to support the use of antipsychotic agents in cocaine-dependent people.[82] Antipsychotic agents may cause QT interval prolongation and, when used concomitantly with cocaine, may compound the risk of sudden death.</p> <p>In the presence of neurologic signs, testing to rule out heat-related cerebral infarction may also be indicated.[83]</p>		
psychosis (Magnun syndrome)	short term	medium
<p>Not to be confused with excited delirium, which is associated with extreme fever and rhabdomyolysis, this is also a consequence of long-term cocaine abuse.</p> <p>Hospitalization, withdrawal of cocaine, and temporary antipsychotics are used in management.</p> <p>Most patients with this disorder believe that insects are trapped beneath their skin and they may have serious excoriations during the process of trying to remove the imaginary insects.[26]</p>		
crack keratitis	short term	medium
<p>Cocaine anesthetizes the cornea, and accidental corneal abrasions may occur.</p> <p>Local ophthalmic antibiotics are indicated.</p>		
hemorrhagic stroke	short term	low
<p>Stroke in cocaine users is almost always hemorrhagic, secondary to pre-existing malformation or aneurysm.</p> <p>Management is the same as for acute cerebrovascular accident of any other etiology.[87] [88]</p>		

Complications	Timeframe	Likelihood
seizures (recurrent)	short term	low
<p>This is an uncommon complication. Its occurrence indicates either an underlying, preexisting seizure disorder, underlying central nervous system pathology, or massive overdose.</p> <p>Recurrent seizures following cocaine use require treatment as they may contribute to complicating conditions (hyperthermia, rhabdomyolysis, acidosis).</p> <p>Phenytoin may not be an effective agent for the treatment of recurrent seizures in the setting of recent cocaine use.</p> <p>Brain imaging studies, electroencephalogram, and cerebrospinal fluid analysis may be indicated following seizure control.</p> <p>Chronic crack cocaine smokers may present with transient choreoathetoid movements.[89]</p>		
pneumomediastinum from smoking crack cocaine	short term	low
<p>Can occur in the smokers of any illicit drug but, whatever the etiology, the treatment is pain relief and observation. This condition almost never requires treatment.[90]</p>		
crack lung	long term	low
<p>Occasionally seen in crack smokers.</p> <p>Typical clinical presentations include chest pain, cough with hemoptysis, dyspnea, or bronchospasm. Eosinophilia is usually found. It can, on occasion, progress to the point of requiring assisted ventilation and intensive medical treatment. Cocaine smoking can cause cumulative lung effects with heavy crack smokers developing emphysematous changes.[91]</p>		
mood disorders (persisting)	variable	medium
<p>Cocaine use may trigger a state resembling mania that may persist in patients with an underlying vulnerability to this condition.</p> <p>Abstinence from cocaine can be associated with depression that reaches a severe state (including suicidal ideation) and persists in some patients.</p> <p>Those with persisting mood symptoms after the cessation of cocaine use may need psychiatric care and psychotropic medication treatment (antidepressants and/or mood-stabilizing agents, as indicated).</p>		
renal failure	variable	medium
<p>Heroin abuse can lead to renal failure, but since nearly a third of heroin abusers also use cocaine[86] it would not be unusual to find a renal failure patient testing positive for both drugs.</p> <p>Cocaine users may develop malignant hyperthermia leading in turn to rhabdomyolysis and renal failure.</p>		
hepatitis B	variable	medium
<p>Intravenous users risk exposure to blood-borne infections.</p>		

Complications	Timeframe	Likelihood
hepatitis C	variable	medium
Intravenous users risk exposure to blood-borne infections.		
HIV	variable	medium
Intravenous users risk exposure to blood-borne infections.		
obstetric complications	variable	medium
Pregnant women with cocaine use disorder experience increased obstetric complications, such as spontaneous abortion, perinatal mortality, premature labor, low birth weight, preeclampsia, and placental abruption.[94] [98]		
Patients will need to be closely monitored and require perinatal counseling and follow-up.		
neonatal complications	variable	medium
Fetal cocaine exposure increases neurodevelopmental, cognitive, and behavioral difficulties, although more research is required on the long-term effects of prenatal exposure. Concerns in the 1980s to 1990s of severe disabilities, "crack baby syndrome," have fortunately not materialized.[94] [99]		
Newborns are unable to metabolize cocaine ingested via breast milk, increasing their risk of acute intoxication.[41]		
sudden death	variable	low
May occur because of respiratory failure, vascular collapse, arrhythmias, and/or myocardial ischemia secondary to acute or chronic misuse.		
acute myocardial infarction (AMI)	variable	low
Cocaine-related AMI is uncommon and is more likely to occur in older patients and those with preexisting coronary disease. However, in adults ages 45 and younger, around 1 in 4 nonfatal AMIs occur in people who have used cocaine 10 or more times.[84]		
Management is the same as for AMI of any other etiology. The position paper on cocaine-associated AMI released by the American Heart Association recommends the avoidance of all beta-blockers acutely, but indicates that recommendations for antithrombotic and antiplatelet therapy should be followed.[85]		
ventricular arrhythmias	variable	low
Standard Advanced Cardiac Life Support protocols should be followed, but they may not be effective in chronic cocaine users as there is likely to be underlying cardiomegaly and concomitant sodium and potassium channel blockade. Defibrillation may be difficult to achieve.		
cardiomyopathy	variable	low
Cocaine abusers only develop this change after prolonged stimulant abuse.[86] The etiology of cocaine cardiomyopathy is not clear. It may be directly from cocaine, a result of multiple small infarcts, or both.		

Complications	Timeframe	Likelihood
If this occurs, the patient should receive routine care (hold beta-blockers in active users), as well as referral for cocaine detoxification.		
chronic skin ulcers	variable	low
<p>Can be seen in injectors and skin-poppers (subcutaneous injection).</p> <p>Can lead to systemic infection, but frequently present as skin infections and abscesses.[92]</p> <p>Rarely, subcutaneous drug injection may lead to necrotizing fasciitis.[93]</p>		
gastrointestinal complications	variable	low
<p>Chronic cocaine use may lead to loss of appetite, malnourishment, and weight loss.[94] All routes of cocaine use can cause xerostomia and bruxism.[95] [96] Cocaine prevents the reuptake of norepinephrine, reducing gastric motility and inhibiting gastric emptying. Cocaine-induced ischemia may result in gastropyloric ulcers, gangrene, and perforation.[97]</p>		

Prognosis

Abrupt withdrawal from stimulants does not require detoxification and many patients can be safely discharged from the emergency room with referral to a drug-counseling center.

The odds of relapse to drug use are high (about 50%).[80]

Patients can benefit from treatment, even those with severe problems related to use. Treatment program participation of over 90 days has been shown to lead to greater improvement for all patient groups.[81]

Diagnostic guidelines

International

Unhealthy drug use: screening (<https://www.uspreventiveservicestaskforce.org/uspstf/recommendation-topics>) [40]

Published by: US Preventive Services Task Force

Last published: 2020

Guidelines for identification and management of substance use and substance use disorders in pregnancy (<https://www.who.int/publications/item/9789241548731>) [41]

Published by: World Health Organization

Last published: 2014

Coexisting severe mental illness (psychosis) and substance misuse: assessment and management in healthcare settings (<https://www.nice.org.uk/guidance/cg120>) [44]

Published by: National Institute for Health and Care Excellence

Last published: 2011

Treatment guidelines

International

Clinical practice guideline for the management of substance use disorders (<https://www.healthquality.va.gov/index.asp>) [77]

Published by: US Department of Veterans Affairs; Department of Defense

Last published: 2021

Health and public policy to facilitate effective prevention and treatment of substance use disorders involving illicit and prescription drugs (<https://www.acponline.org/cgi-bin/policy-library>) [78]

Published by: American College of Physicians

Last published: 2017

Drug misuse prevention: targeted interventions (<https://www.nice.org.uk/guidance/ng64>) [79]

Published by: National Institute for Health and Care Excellence

Last published: 2017

Guidelines for identification and management of substance use and substance use disorders in pregnancy (<https://www.who.int/publications/item/9789241548731>) [41]

Published by: World Health Organization

Last published: 2014

Coexisting severe mental illness (psychosis) and substance misuse: assessment and management in healthcare settings (<https://www.nice.org.uk/guidance/cg120>) [44]

Published by: National Institute for Health and Care Excellence

Last published: 2011

Drug misuse in over 16s: psychosocial interventions (<https://www.nice.org.uk/guidance/cg51>) [50]

Published by: National Institute for Health and Care Excellence

Last published: 2007

Online resources

1. [Narcotics Anonymous \(https://na.org\)](https://na.org) (*external link*)
 2. [Cocaine Anonymous \(https://ca.org\)](https://ca.org) (*external link*)
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Key articles

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Images



Figure 1: Crack lip: burns to the lips, caused by hot pipes, are characteristic of crack cocaine smokers

From: Karch S. Karch's pathology of drug abuse. 4th ed. Boca Raton, FL: CRC Press; 2008. Used with permission

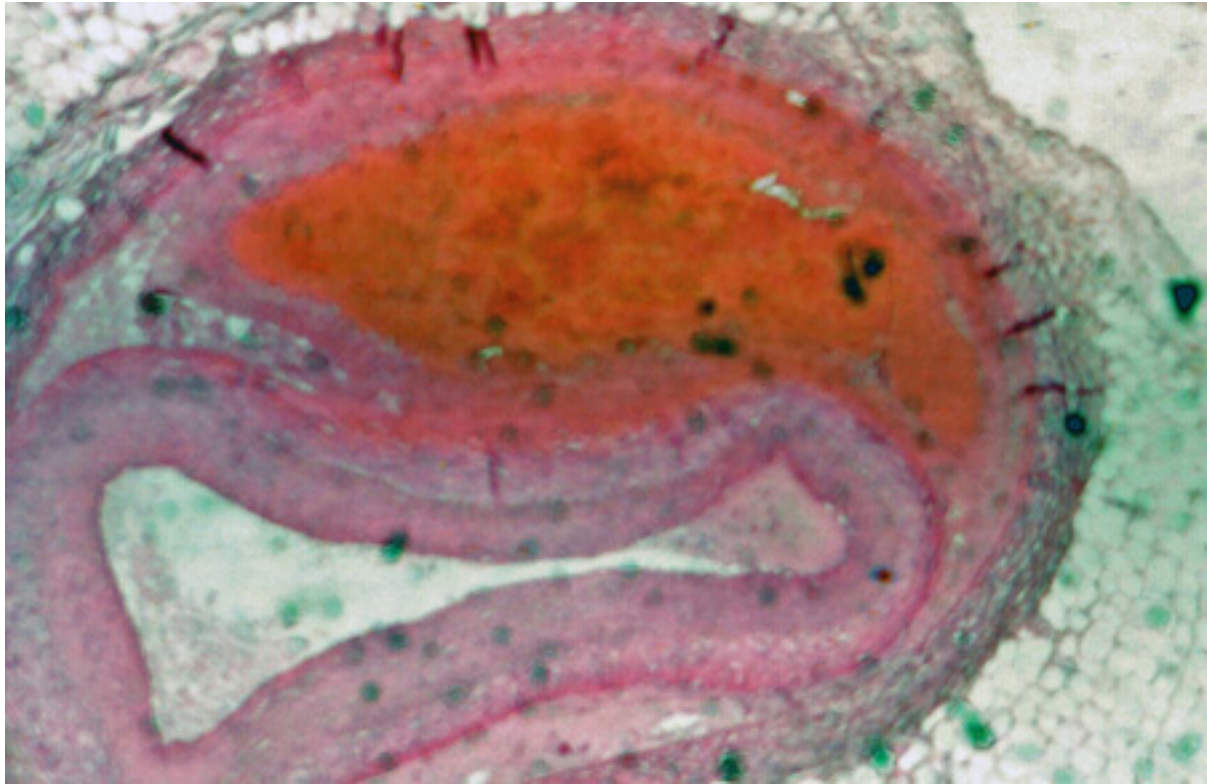


Figure 2: Coronary dissection: acute myocardial infarction is uncommon in crack cocaine smokers but does occur occasionally. One cause, usually forgotten, is coronary artery dissection

From: Karch S. Karch's pathology of drug abuse. 4th ed. Boca Raton, FL: CRC Press; 2008. Used with permission

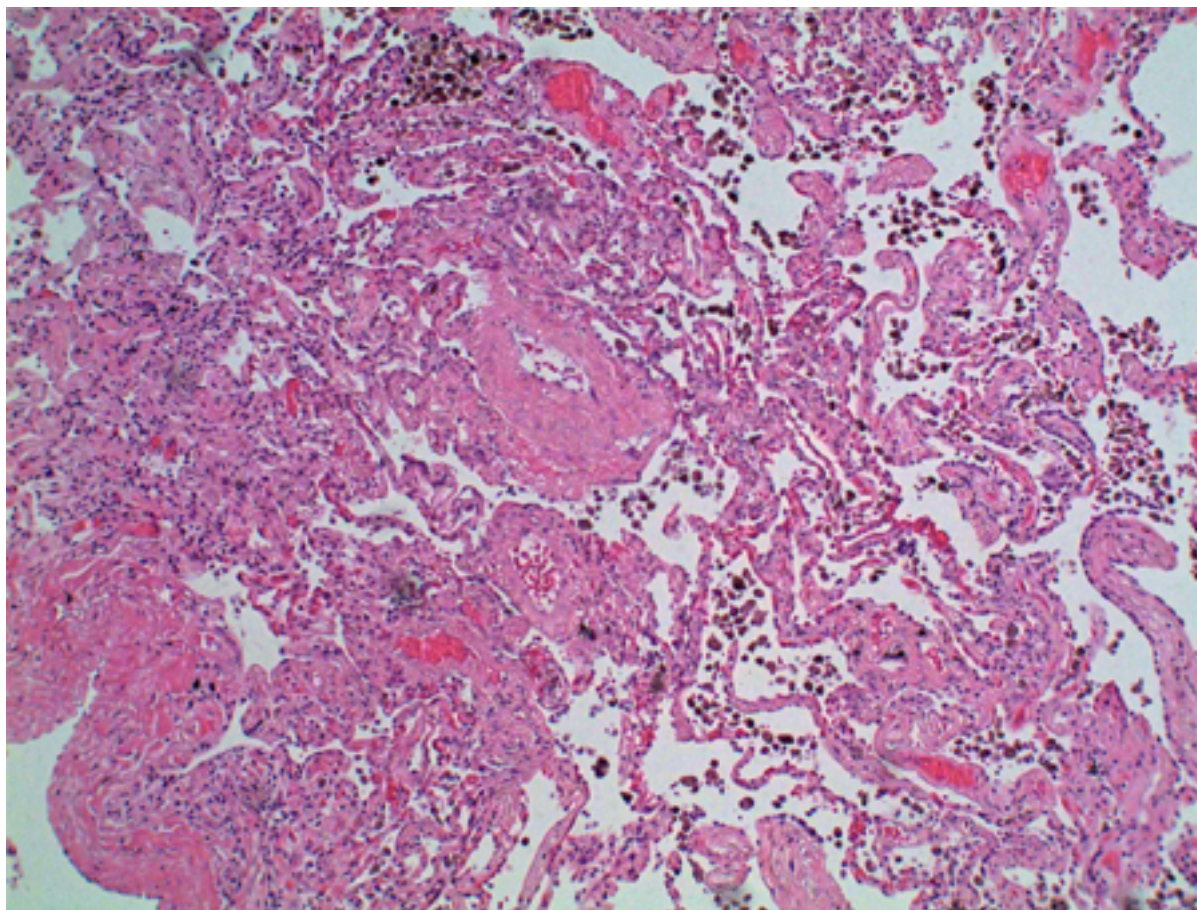


Figure 3: Hematoxylin and eosin stained lung section from a 56-year-old male chronic cocaine abuser who died of an apparent arrhythmia. He had been complaining of shortness of breath for several weeks. Note the thickened alveolar septa; medial hyperplasia is obvious in several vessels. The very dark cells scattered among the alveoli are hemosiderin-containing macrophages, a common find in pulmonary hypertension

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Figure 1 – BMJ Best Practice Numeral Style

5-digit numerals: 10,000

4-digit numerals: 1000

numerals < 1: 0.25

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