

Stimulant Use and Intoxication

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THE STORY IN ONE SENTENCE

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“Stimulant intoxication means dopamine and norepinephrine surge out of control, pushing the body toward three deadly endings: heart attack, brain bleed, or organ shutdown from overheating.”

Normal anatomy — the body's job

Normally, dopamine (the brain chemical that signals reward, motivation, and movement) and norepinephrine (the brain chemical that switches on the body's alarm and focus systems) rise and fall in a smooth, controlled rhythm. The prefrontal cortex—the front part of the brain that plans, judges risk, and pumps the brakes on impulses—keeps these chemicals in balance so you feel alert and motivated without tipping into panic or overheating.

BODY'S JOB

Dopamine flows in tiny pulses from the ventral tegmental area (a cluster of cells deep in the midbrain) to the nucleus accumbens (the brain's reward hub) and the prefrontal cortex, saying "this matters—pay attention, move toward it." Norepinephrine surges from the locus coeruleus (a small blue spot in the brainstem) to wake up the whole brain and body: heart rate climbs, blood vessels tighten to raise pressure, pupils widen to let in more light, and muscles tense for action. When the moment passes, the prefrontal cortex signals the brainstem to dial things back down—dopamine and norepinephrine are pumped back into storage or broken down by enzymes, and the body returns to a resting hum. Body temperature, heart rate, blood pressure, and thinking all stay inside a safe window because the feedback loop is working.

1. The ventral tegmental area releases a measured pulse of dopamine → the nucleus accumbens lights up ("this feels good") → the prefrontal cortex evaluates ("is this safe? should I keep going?") and sends a brake signal when enough is enough.

2. 2. The locus coeruleus releases norepinephrine → the heart pumps harder, blood vessels tighten, pupils dilate, and the brain shifts into high-alert mode.
3. 3. When the stimulus or stressor fades, the prefrontal cortex tells the locus coeruleus and ventral tegmental area to stop firing, enzymes (MAO and COMT) break down extra dopamine and norepinephrine, and transporters pull the chemicals back into storage.
4. 4. Heart rate, blood pressure, body temperature, and alertness drift back to baseline—muscles relax, pupils shrink, breathing slows, and thinking becomes calm and organized again.

What breaks

Stimulants (cocaine, meth, MDMA) block the pumps that normally suck dopamine and norepinephrine back into storage, and some also force the brain to dump even more—so the chemicals flood the spaces between brain cells and keep firing the alarm and reward circuits over and over without a break. The prefrontal cortex—the part that should say "stop, this is dangerous"—gets overwhelmed and goes offline, so the body's throttle is stuck wide open with no brakes.

CLINICAL TERM

Stimulants inhibit the dopamine transporter (DAT) and norepinephrine transporter (NET), and amphetamines also reverse the transporters to pump MORE neurotransmitter out into the synapse. The result is sustained, supraphysiologic dopamine and norepinephrine signaling. The prefrontal cortex—which normally exerts top-down inhibitory control over subcortical reward and arousal centers—becomes hyperactive initially then functionally impaired under the flood, losing its ability to regulate impulse, judgment, and autonomic tone. Peripheral alpha- and beta-adrenergic receptors are overstimulated, causing a fast heart rate (tachycardia), high blood pressure (hypertension), vasoconstriction, hyperthermia, and end-organ starved blood flow (ischemia).

How the body compensates

At first the body tries to compensate for the chemical storm—the heart pumps harder to keep blood pressure steady despite tight vessels, sweating ramps up to shed heat, and the person may feel euphoric and superhuman because dopamine is sky-high. But these workarounds burn through reserves fast, and once they fail the system collapses suddenly: the heart muscle runs out of oxygen, a blood vessel tears under the pressure, the kidneys clog with broken-down

muscle, or the brain's electrical system misfires into a seizure. The danger is that the person looks and feels fine—even invincible—right up until something catastrophic breaks.

1. The heart beats faster and harder to keep blood flowing even though vessels are squeezed tight—this buys minutes to hours, but the heart muscle is burning oxygen faster than the coronary arteries (the vessels that feed the heart itself) can deliver it, especially because those arteries are vasoconstricted too. If demand outstrips supply long enough, part of the heart muscle dies (myocardial tissue death from blocked blood flow (infarction)—heart attack).
2. The kidneys try to filter the flood of stress hormones and metabolic waste, but as body temperature climbs and muscles break down (rhabdomyolysis), huge proteins (myoglobin from dying muscle cells) clog the kidney's tiny filters. The kidneys start to fail, waste piles up in the blood, and urine turns dark brown or stops altogether.
3. Sweating increases to cool the body, but if the person is dancing in a hot room (common with MDMA), dehydrated, or if vasoconstriction prevents heat from reaching the skin, core temperature keeps climbing. Once it crosses ~104°F (40°C), cell membranes start to fall apart, the blood clotting system goes haywire (DIC—disseminated intravascular coagulation), and multiple organs fail at once.
4. The prefrontal cortex tries to maintain executive control under the dopamine flood—the person may still talk and move—but judgment, insight, and emotional brakes are gone. Paranoia, hallucinations, delusions, and violent impulses emerge because the reality-testing circuits are offline. The person cannot see that their thoughts are not real or that they are in danger.
5. After the high peaks, dopamine crashes far below baseline (the stores are empty and the brain is exhausted). The person plunges into deep depression, anhedonia (nothing feels good), fatigue, and intense cravings—this "crash" or "comedown" is when suicide risk spikes, because the neurochemical safety net is gone and the prefrontal cortex is still offline.

Domino effect

1. Stimulant blocks or reverses the dopamine and norepinephrine transporters — Cocaine plugs the dopamine transporter (DAT) and norepinephrine transporter (NET) so the chemicals cannot be pumped back into storage. Amphetamines (meth, MDMA) go further—they reverse the pumps, forcing stored dopamine and norepinephrine to flood OUT into the space between brain cells. Either way, the synapse is flooded and the signal keeps firing without stopping.

2. Dopamine floods the nucleus accumbens and prefrontal cortex → euphoria, invincibility, then impaired judgment — The nucleus accumbens (the brain's reward hub) lights up far beyond any natural reward—the person feels intense pleasure, energy, and confidence. But the prefrontal cortex (the front of the brain that weighs risk and applies brakes) gets overwhelmed by the chemical storm and goes offline—impulse control, insight, and the ability to recognize danger all vanish. The person may believe they can fly, that everyone is plotting against them, or that they need to keep using no matter what.
3. Norepinephrine floods the body → heart races, blood pressure spikes, pupils dilate, body heat climbs — Norepinephrine hits alpha and beta receptors throughout the body like a stuck accelerator. The heart beats faster and harder (tachycardia, often 120–180 bpm), blood vessels clamp tight (vasoconstriction), so blood pressure can shoot to 180/110 or higher. Pupils blow wide open (mydriasis). Muscles twitch and burn fuel non-stop, and the hypothalamus (the brain's thermostat) is overridden—core temperature climbs toward 104°F (40°C) or beyond.
4. Vasoconstriction and demand mismatch → chest pain, heart attack, or aortic dissection — The coronary arteries (the vessels feeding the heart muscle) squeeze shut just when the heart is working hardest and needs the most oxygen. Even in a young person with no plaque, the mismatch can cause starved blood flow (ischemia) (not enough blood reaching the tissue to feed it) → chest pain, EKG changes, troponin leak, and sometimes full heart attack (myocardial infarction) (heart muscle dies). Cocaine is especially notorious for this. If blood pressure spikes above ~200 systolic, the aorta (the body's main artery) can tear along its inner lining—this is aortic dissection, a surgical emergency.
5. Hyperthermia (body overheats) → rhabdomyolysis, kidney failure, and multi-organ collapse — When core temperature stays above 104°F (40°C), proteins inside cells start to denature (unfold and stop working), cell membranes leak, and muscle cells break open (rhabdomyolysis). Myoglobin (the oxygen-carrier inside muscle) spills into the blood and clogs the kidney's filters, causing acute kidney injury. Meanwhile the clotting system goes haywire (DIC), the liver fails, and the brain swells. This is why untreated hyperthermia from stimulants can kill in hours.
6. Dopamine overload → hallucinations, delusions, paranoia, and agitation (stimulant psychosis) — Too much dopamine in the mesolimbic pathway (the circuit from the ventral tegmental area to the nucleus accumbens and prefrontal cortex) scrambles perception and thinking—the person sees, hears, or believes things that are not real (psychosis). Paranoid delusions ("everyone is after me") and aggressive, agitated behavior are common. Because the prefrontal cortex is offline, the person cannot reality-test or calm down, so they may become violent toward others or themselves.

7. Seizure from overstimulation of the brain's electrical system — The chemical flood (especially cocaine and meth) lowers the seizure threshold—the normal brakes on runaway electrical activity in the cortex (provided by GABA, the brain's main calming neurotransmitter) are overwhelmed by the excitatory storm. The brain misfires into a generalized tonic-clonic seizure (whole body shakes, person loses consciousness). Seizures burn even more energy, worsen hyperthermia, and can cause permanent brain injury if they do not stop (status epilepticus).
8. Dopamine crash and severe depression after the high ends — After hours of forced dopamine release, the brain's stores are empty and the receptors are exhausted or down-regulated (the brain turns down the volume to protect itself). Dopamine drops far below baseline, leaving the person in a deep pit: nothing feels good (anhedonia), energy is gone, thinking is slow and dark, and intense cravings for the drug spike because the brain remembers the shortcut to feeling normal. This crash is when suicide risk is highest, because the neurochemical safety net is gone and hopelessness floods in.

Symptoms · what the patient feels, and why

- Racing heartbeat (tachycardia): Stimulants like cocaine, methamphetamine, and ADHD medicines trigger the sympathetic nervous system (the body's 'gas pedal'), releasing norepinephrine (a chemical that speeds the heart) and making the heart pound faster, sometimes over 100 beats a minute at rest.
- High blood pressure (hypertension): The same sympathetic surge tightens blood vessels all over the body, so the heart has to pump harder against stiffer pipes, pushing pressure up and sometimes causing headache or nosebleeds.
- Wide, large pupils (mydriasis): Stimulants block the brake on the muscles that open the pupil, so even in bright light the black circle stays big and the person may look startled or wired.
- Sweating and feeling too hot: The drugs crank up metabolism (how fast the body burns fuel) and narrow skin blood vessels, trapping heat inside; sweat glands work overtime to cool the body down, but the person still feels overheated.
- Restlessness, jitteriness, or agitation: Extra dopamine (the brain's reward and 'go' signal) and norepinephrine flood the basal ganglia (the movement-control center) and limbic system (the emotion hub), so the person cannot sit still and may pace, fidget, or feel wound up inside.
- Chest pain: Stimulants tighten the coronary arteries (the small pipes feeding the heart muscle) and make the heart work harder at the same time, so part of the muscle may not get enough oxygen (ischemia), causing sharp or squeezing pain that can mimic a heart attack.

- **Seizure (sudden jerking or loss of awareness):** Very high doses or sensitivity can make brain cells fire all at once instead of in an orderly pattern, overwhelming the cortex (the brain's outer thinking layer) and causing the whole body to shake or the person to black out.
- **Confusion, paranoia, or hallucinations:** Too much dopamine in the mesolimbic pathway (the brain's reward circuit) and prefrontal cortex (the front reasoning area) distorts reality; the person may hear voices, see things that are not there, or believe others are plotting against them.
- **Severe headache:** Sudden spikes in blood pressure stretch and irritate the blood vessels wrapping the brain (the meninges), or in rare cases a vessel can tear or bleed (hemorrhagic stroke), both causing intense, throbbing head pain.
- **Nausea or vomiting:** The sympathetic overdrive slows the stomach and gut (digestion is a 'rest mode' job), and high dopamine can trigger the vomiting center in the brainstem (the area postrema), making the person feel sick and throw up.

Focused exam

- **Pupils blown wide open (mydriasis):** Stimulants flood the sympathetic nervous system (the body's gas pedal). Norepinephrine makes the muscle that opens the pupil squeeze hard, so the pupil stays big and round. Wide pupils that don't shrink when you shine a light mean the drug is still active in the brain.
- **Heart rate above 120 beats per minute, blood pressure above 160/100 mmHg:** Stimulants release huge amounts of norepinephrine and dopamine, which tell the heart to beat faster and blood vessels to squeeze tight. This drives up pressure and rate, forcing the heart to work so hard it can run out of oxygen and trigger a heart attack—even in young people with healthy arteries.
- **Skin very hot to the touch (core temperature above 39°C or 102°F), sweating heavily, or not sweating at all:** Stimulants turn off the hypothalamus (the brain's thermostat) and rev up muscle activity, so the body makes more heat than it can dump. If the temperature stays above 39°C, proteins inside muscle cells start to break apart (rhabdomyolysis) and kidneys can fail in a few hours.
- **Agitation—restless, picking at skin, talking very fast, or saying paranoid things (for example, 'Everyone is watching me'):** Too much dopamine floods the striatum (the part of the brain that controls movement and reward) and the limbic system (the brain's alarm and fear center). This makes the person feel jumpy, unable to sit still, and convinced that danger is everywhere—even when it is not.
- **Chest pain or pressure, trouble breathing:** Stimulants squeeze the coronary arteries (the blood vessels that feed the heart muscle). When the heart can't get enough oxygen, it hurts—that is chest pain. This can mean a real heart attack is starting, and it can happen even in someone who has never had heart problems before.

- Muscle rigidity (stiff arms or legs), jerking movements, or a seizure: A huge surge of dopamine and norepinephrine can make the motor cortex (the brain's movement control center) fire too much at once. Muscles lock up or jerk uncontrollably, and in some cases the whole brain storms into a seizure. This is a medical emergency because seizures can stop breathing.

Diagnostics · every test answers a question

- Electrocardiogram (ECG) → Is the heart rhythm normal, or is there a heart attack starting?
- Troponin I or troponin T (cardiac biomarker) → Is heart muscle actually damaged?
- Creatine kinase (CK) and urine myoglobin → Are muscles breaking down and poisoning the kidneys?
- Basic metabolic panel (sodium, potassium, creatinine, glucose) → Are the kidneys failing? Are electrolytes dangerously off?
- Urine drug screen (immunoassay) ± confirmatory testing (gas chromatography-mass spectrometry, GC-MS) → Which drug is on board?
- Non-contrast head CT scan → Is there bleeding in the brain, or a stroke?

Treatment logic

- Benzodiazepines—lorazepam 2–4 mg IV or IM, or diazepam 5–10 mg IV, repeated every 10–15 minutes as needed → Benzodiazepines boost GABA (the brain's main brake chemical) in the amygdala (the alarm center) and motor cortex (movement control). This calms agitation, lowers blood pressure and heart rate, stops seizures, and brings down body temperature by quieting muscle overactivity. It breaks the cascade: agitation → high pressure → heart attack → seizure.
- Active cooling—remove clothing, apply ice packs to groin/armpits/neck, spray with cool water and fan, or use a cooling blanket if core temperature is above 39°C (102°F) → Cooling pulls heat out of the body faster than it is being made. This prevents the proteins inside muscle cells from denaturing (unfolding and breaking), which stops rhabdomyolysis and protects the kidneys, heart, and brain from heat damage.
- IV fluids (normal saline or lactated Ringer's) at 200–500 mL/hour, aiming for urine output above 200–300 mL/hour; add sodium bicarbonate (150 mEq in 1 liter D5W) if urine is dark or myoglobin-positive → High-volume fluids dilute myoglobin in the blood and flush it through the kidneys before it can crystallize and clog the tubules. Bicarbonate makes urine alkaline (pH above 6.5), which keeps myoglobin soluble. Together they prevent acute kidney failure.

- Antipsychotic—haloperidol 5 mg IM or olanzapine 10 mg IM, only if psychosis (paranoia, hallucinations, delusions) persists after adequate benzodiazepine dosing → Antipsychotics block dopamine D2 receptors in the prefrontal cortex (the thinking center) and limbic system (fear and emotion center), which quiets false beliefs and stops hallucinations. This makes the person safer and less terrified.
- Avoid beta-blockers (like metoprolol or propranolol) for high blood pressure or fast heart rate → Beta-blockers block only beta receptors (which open blood vessels). In stimulant intoxication, alpha receptors (which squeeze vessels) are still firing hard. Blocking beta leaves alpha unopposed, so vessels clamp down even tighter and blood pressure can paradoxically spike higher.
- Contingency management (small cash or vouchers for clean urine tests) + cognitive behavioral therapy + stable housing + peer recovery support, started before discharge → Stimulants hijack the ventral tegmental area and nucleus accumbens (the brain's reward circuit), teaching the brain that only the drug feels good. Contingency management retrains that circuit by giving immediate, tangible rewards for staying clean—it is the only behavioral treatment with strong evidence for stimulant use disorder. Therapy and housing rebuild the scaffolding the person needs to stay safe.

Medications

Benzodiazepines (lorazepam, diazepam) · GABA-A receptor agonist

Benzodiazepines turn up GABA (the brain's main calming signal) at GABA-A receptors, which are like brake pedals scattered all over the brain. When someone is high on stimulants, their brain is flooded with dopamine and norepinephrine (chemicals that rev everything up). Benzodiazepines do not turn off the dopamine surge, but they do quiet the overheated circuits, especially the ones driving agitation, fast heart rate, high blood pressure, and seizures.

1. The drug locks onto GABA-A receptors and makes the channel open wider and stay open longer.
2. More chloride (a negative charge) flows into the nerve cell, making it harder to fire.
3. The overall electrical activity in the brain slows down.
4. Heart rate, blood pressure, and muscle tension drop because the brainstem and spinal circuits calm down.
5. Agitation, anxiety, and seizure risk all go down as the overheated circuits cool off.

SAFETY WATCH

Can slow breathing, especially if the person also took opioids or alcohol. · Risk of dependence if used repeatedly; taper slowly when stopping. · Paradoxical agitation (rarely, the person gets more agitated instead of calmer) can happen, especially in young children or people with brain injury. · Avoid giving beta-blockers (like propranolol) early in stimulant intoxication because blocking beta receptors can leave alpha receptors unopposed, which can spike blood pressure dangerously high.

Intravenous fluids (0.9% normal saline or lactated Ringer's) · Volume resuscitation

IV fluids are not a drug but are a core part of treatment. Stimulants make the heart race and the body overheat, which causes sweating and dehydration. They also constrict blood vessels, which can starve the kidneys. If muscles break down (rhabdomyolysis), they release myoglobin (a protein) that can clog the kidney filters like wet sand in a drain. Fluids flush the kidneys, dilute the myoglobin, and keep urine flowing so the kidneys do not shut down.

1. Saline or Ringer's is infused into a vein to increase the volume of liquid in the blood.
2. Blood pressure stabilizes and blood flow to the kidneys improves.
3. The kidneys get more fluid to filter, which dilutes harmful breakdown products.
4. Urine output goes up, carrying away myoglobin and creatine kinase (muscle waste) before they damage the kidney filters.
5. Body temperature may drop slightly as circulation improves and sweating is replaced by rehydration.

SAFETY WATCH

Too much fluid too fast can overload the heart, especially if the person already has heart failure or kidney disease. · Monitor urine output, creatine kinase (CK), and creatinine to check for muscle breakdown and kidney function. · Watch for fluid in the lungs (pulmonary swelling (edema)) if you hear crackles when listening to the chest.

Antipsychotics (haloperidol, olanzapine, quetiapine) for severe psychosis · Dopamine D2 receptor antagonist

Stimulants flood the brain with dopamine, especially in the mesolimbic pathway (the circuit that links motivation and reality testing). Too much dopamine in this pathway can cause psychosis (hallucinations, paranoia, delusions). Antipsychotics block dopamine D2 receptors in

that circuit, which quiets the hallucinations and paranoia. They are used **ONLY** when psychosis is severe and does not calm down with benzodiazepines alone.

1. The antipsychotic locks onto dopamine D2 receptors and blocks dopamine from binding.
2. Dopamine signals in the mesolimbic pathway drop, which reduces hallucinations and paranoia.
3. Thought organization improves as the mesocortical circuit also calms.
4. Agitation may decrease, though benzodiazepines usually do more for agitation than antipsychotics.

SAFETY WATCH

Can LOWER the seizure threshold, which is already high in stimulant intoxication, so benzodiazepines should be given first. · Can worsen hyperthermia (high body temperature) because they interfere with the body's cooling system. · Risk of neuroleptic malignant syndrome (NMS), a rare but life-threatening reaction with muscle rigidity, fever, and confusion. · Haloperidol can prolong the QT interval on EKG, raising the risk of a dangerous heart rhythm called torsades de pointes. · Avoid in people with known heart rhythm problems or low potassium/magnesium.

External cooling (ice packs, cooling blankets, evaporative cooling) for hyperthermia · Physical intervention

Stimulants rev up metabolism and muscle activity, which makes the body produce heat faster than it can get rid of it. They also mess with the hypothalamus (the brain's thermostat), so sweating may not work right. If body temperature climbs above 104°F (40°C), proteins start to unfold and cells die, especially in the brain, kidneys, and liver. External cooling pulls heat out of the body directly through the skin before organs fail.

1. Ice packs are placed at the neck, armpits, and groin (where big blood vessels run close to the skin).
2. Cooling blankets or misting the skin with water while a fan blows air (evaporative cooling) pulls heat away.
3. Blood flowing near the skin cools down and then carries that cooler temperature back to the core.
4. Core body temperature drops toward normal (below 102°F or 38.9°C).
5. Risk of seizures, brain swelling, and multi-organ failure goes down as temperature normalizes.

SAFETY WATCH

Monitor temperature continuously; stop cooling when core temp hits 102°F to avoid overcooling (hypothermia). · Shivering creates MORE heat, so give benzodiazepines to prevent shivering if it starts. · Do NOT give antipyretics (acetaminophen, ibuprofen) for stimulant hyperthermia—they do not work because the hypothalamus is not raising the set point like in a fever; the body is just making too much heat.

Contingency management (behavioral therapy with rewards) · Behavioral intervention

Stimulant use disorder rewires the brain's reward circuit (the nucleus accumbens and ventral tegmental area) so that the drug becomes the strongest reward signal, stronger than food, sleep, or relationships. Contingency management gives immediate, tangible rewards (vouchers, small prizes) every time a urine drug test comes back negative. This taps into the same dopamine reward pathway and trains the brain to link staying clean with a positive payoff.

1. The person gives a urine sample; if it is negative for stimulants, they earn a voucher or prize immediately.
2. The immediate reward triggers a dopamine release in the nucleus accumbens.
3. Over time, the brain begins to associate staying clean (rather than using) with that dopamine reward.
4. The prefrontal cortex strengthens connections that support planning and self-control.
5. Relapse rates drop and abstinence duration increases compared to counseling alone.

SAFETY WATCH

Requires consistent funding and access; many clinics cannot afford voucher programs. · Works best when combined with case management, housing support, and treatment for co-occurring mental health conditions (depression, PTSD, ADHD). · Not a cure; relapse is common if the program stops or if social stressors (homelessness, trauma, unemployment) are not addressed.

Red flags

- Chest pain or pressure (may signal heart attack or torn aorta)
- Seizure or uncontrollable shaking
- Severe confusion, hallucinations, or violent agitation
- Temperature above 104°F (40°C) or muscle rigidity (risk of dangerous overheating)
- Sudden worst-ever headache or one-sided weakness (possible stroke or brain bleed)

Nursing priorities

1. Place patient on continuous cardiac monitor and pulse oximeter; obtain baseline vital signs every 5–15 minutes until stable. — Stimulants trigger dangerous heart rhythms (ventricular a fast heart rate (tachycardia), ventricular fibrillation) and sudden cardiac arrest. Continuous monitoring catches lethal arrhythmias early so we can defibrillate immediately and save the patient's life.
2. Obtain IV access and prepare to give benzodiazepines—lorazepam 2–4 mg IV or diazepam 5–10 mg IV—immediately if the patient is agitated, has chest pain, or systolic blood pressure above 180 mmHg. — Benzodiazepines calm the overactive sympathetic nervous system (the fight-or-flight response), slow the heart, lower blood pressure, prevent seizures, and reduce the oxygen demand on the heart. They are the first-line treatment for almost every stimulant complication.
3. Measure core body temperature with a rectal or esophageal thermometer; if above 39°C (102°F), begin active cooling immediately—remove all clothing, apply ice packs to groin, armpits, and neck, and use evaporative cooling with a fan and water mist. — Hyperthermia (overheating) above 40°C (104°F) causes proteins in the body to denature (unfold and stop working), leading to multi-organ failure, brain damage, and death. Aggressive cooling within the first hour dramatically improves survival.
4. Start IV normal saline or lactated Ringer's at 200–500 mL per hour; monitor urine output and aim for at least 200–300 mL per hour of clear or pale yellow urine. — Aggressive IV hydration flushes myoglobin (muscle breakdown protein) and other toxins through the kidneys before they cause acute kidney injury. Adequate urine output proves the kidneys are working and prevents renal failure.
5. Draw labs immediately: basic metabolic panel (electrolytes, creatinine), creatine kinase (CK), troponin, complete blood count, and urine drug screen; check fingerstick glucose. — Creatine kinase above 1,000 U/L signals rhabdomyolysis; troponin detects heart muscle damage; low sodium or high potassium can cause seizures or fatal arrhythmias; high creatinine means the kidneys are failing. Low blood sugar (Hypoglycemia) (low blood sugar) can mimic or worsen agitation.
6. Create a calm, quiet, dimly lit environment; remove unnecessary staff and stimuli; speak in a low, reassuring voice; avoid physical restraints unless the patient is an imminent danger to self or others. — Sensory overload—bright lights, loud noises, multiple people—worsens agitation and sympathetic overdrive, raising heart rate, blood pressure, and body temperature. A calm environment reduces the need for additional sedation and lowers complication risk.

7. Perform a 12-lead EKG within 10 minutes if the patient reports any chest pain, shortness of breath, or has a history of heart disease; repeat troponin at 3 hours and 6 hours. — Stimulants cause coronary artery vasospasm (the heart arteries squeeze shut) and can trigger acute heart attack (myocardial infarction) (heart attack). Early EKG and serial troponins detect heart damage so we can start life-saving treatments like antiplatelet drugs and avoid beta-blockers, which can worsen vasospasm.
8. Assess for signs of stroke or intracranial bleeding (hemorrhage) (brain bleed) every 15–30 minutes: ask the patient to smile, raise both arms, and repeat a simple sentence; check pupil size and reactivity; note any sudden severe headache, vomiting, or one-sided weakness. — Severe high blood pressure (hypertension) from stimulants can rupture blood vessels in the brain, causing bleeding-driven (hemorrhagic) stroke or subarachnoid bleeding (hemorrhage). Rapid recognition and urgent CT imaging allow neurosurgery to stop the bleeding and prevent permanent brain damage or death.

Sources

- American College of Emergency Physicians (ACEP) 2023 toxicology guidelines
- SAMHSA Treatment Improvement Protocol (TIP) 33: stimulant use disorder
- American Heart Association scientific statement on cardiovascular complications of cocaine and methamphetamine
- UpToDate clinical review on sympathomimetic toxicity

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