

[Home](#)

2. Ketamine

Ketamine

Generic name: Ketamine

Brand name: [Ketalar](#)

Dosage form: Injection 200 mg/20 mL (10 mg/mL), 500 mg/10 mL (50 mg/mL), and 500 mg/5 mL (100 mg/mL)

Drug class: [General anesthetics](#)

Medically reviewed by [Melisa Puckey, BPharm](#). Last updated on Aug 27, 2024.

[Uses](#) [Side effects](#) [Before taking](#) [Warnings](#) [Dosage](#) [Interactions](#)

What is ketamine?

Ketamine is used as an anesthetic for surgery, a treatment for depression, and is a drug of abuse. Ketamine is FDA-approved as an anesthetic to put you to sleep for [surgery](#) and to help prevent pain and discomfort. Ketamine for [depression](#) is an off-label use, and its use for depression is currently being researched in clinical trials. It is also a drug of abuse that is used illegally recreationally for its hallucinogenic properties and is known to be a “date rape” drug as it causes short-term memory loss.

Ketamine is not an [opioid](#) (narcotic); it is an NMDA receptor antagonist, which means it blocks the N-methyl-D-aspartate (NMDA) neurotransmitter in the brain.

When used for anesthesia, ketamine is given as an intravenous injection (IV) or as an intramuscular injection (IM).

Esketamine ([Spravato](#)) is used to treat depression; it is one of the forms of racemic ketamine and was FDA-approved in 2019 for specific types of depression. Spravato is a nasal spray that is used under strict medical supervision and is not used by patients at home.

Ketamine is FDA-approved as a general anesthetic to be used as the sole anesthetic agent for diagnostic and surgical procedures that do not require skeletal muscle relaxation. It is also used to induce anesthesia prior to the administration of other general anesthetic agents and as a supplement to other anesthetic agents. Ketamine is not FDA-approved for depression; it is used off-label for this condition.

Ketamine Therapy

Ketamine infusion therapy has been used for depression in patients with treatment-resistant depression (TRD) for its rapid antidepressant effects. Depression is an off-label use of ketamine as it is not an FDA-approved indication. In clinical trials ketamine therapy is mainly given as intravenous infusion, but may be given as intranasal spray, slow release tablets, sublingual tablets, or other forms.

In clinical trials, ketamine infusions have been given as a single dose once or in multi-dose therapy, as infusions once, twice, or 3 times weekly for 2 weeks during the acute treatment phase. Sometimes infusions have been continued once

or twice weekly during the continuation phase for a total of 4–6 weeks of therapy or gradually tapered. In clinical trials ketamine infusion therapy dose is lower than an anesthetic dose. If patients have not responded to several initial infusions, then it appears unlikely that they will respond to further infusions.

Is ketamine a Controlled Substance?

Yes, ketamine is a controlled substance classified as a Schedule III drug under the DEA [Controlled Substances Act](#). This means that ketamine has a potential for abuse that is less than the drugs in schedules I and II. Abuse of the ketamine may lead to a moderate to low potential for physical dependence but high psychological dependence. Drugs that are classified as Schedule III are currently accepted for medical use in treatment in the U.S.

Why is ketamine abused?

Ketamine is abused illegally due to its hallucinogenic and dissociative effects. It leads to changes in sensory experiences, dream-like states, and also a distortion of sights, colors, sounds, self, and one's environment. Common ketamine street names are Special K, K, super k, ket, ketters, vitamin K, cat tranquilizer, C or horse trunk. Ketamine for abuse is usually a clear liquid or an off-white powder. It is often "snorted" up the nose, injected, mixed into drinks, or smoked with marijuana or tobacco. Other dissociative drugs include phencyclidine (PCP), Salvia divinorum, and dextromethorphan (DXM). Hallucinogens include LSD, psilocybin, and mescaline.

Abuse of large doses of this medicine can also lead to powerful visual hallucinations that are intensified by environmental stimuli. Coma and deep unconsciousness can occur. When higher doses of ketamine are abused or during emergence, it is reported to produce vivid dreams and an "out-of-body", "K-hole" or "near-death" hallucinogenic experience, often reported as terrifying (similar to a bad LSD trip).

Abuse of ketamine can be linked with short-term and long-term problems:

- Short-term problems: Problems with attention, learning, and memory; dreamlike states, hallucinations; sedation; confusion; loss of memory; raised blood pressure; unconsciousness; dangerously slowed breathing.
- Long-term problems: Ulcers and pain in the bladder; kidney problems; stomach pain; depression; poor memory.

There is also the risk of HIV, hepatitis, and other infectious diseases from shared needles.

Ketamine use can be **fatal** in people who are alcoholics or acutely intoxicated with alcohol. There are animal reports of an increased risk of toxicity when ketamine is combined with caffeine. Theoretically, this may be a concern in people who have consumed energy drinks, often done at nightclubs where this medicine may be abused.

The intensity of side effects is related to the dose of the drug consumed.

Ketamine side effects

Serious ketamine side effects

Serious ketamine side effects include:

- [slow heart rate](#), weak or shallow breathing; or
- a light-headed feeling, like you might pass out;
- jerky muscle movements that may look like convulsions;

- painful or difficult urination, increased urination, loss of bladder control, blood in your urine.

Call your doctor at once if you have any of the above symptoms.

Tell your caregivers if you have hallucinations or unusual thoughts while waking up from [anesthesia](#).

Allergic reactions - get emergency medical help if you have signs of an allergic reaction, including hives, difficulty breathing, and swelling of your face, lips, tongue, or throat.

Common ketamine side effects

Common ketamine side effects are confusion or a dream-like feeling.

This is not a complete list of side effects, and others may occur. Call your doctor for medical advice about side effects. You may report side effects to the FDA at 1-800-FDA-1088.

 [Ketamine side effects](#) (more detail)

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Who should not use ketamine?

Ketamine should not be used in patients for whom a significant elevation of blood pressure would constitute a serious hazard or in patients with known hypersensitivity to ketamine or to any excipient.

 [Ketamine pregnancy and breastfeeding warnings](#) (more detail)

Warnings

Emergency reactions Tell your caregivers if you have hallucinations or unusual thoughts while waking up from anesthesia.

Hemodynamic instability Temporary increases in blood pressure, heart rate, and cardiac index may be observed during administration. Vital signs and cardiac function should be monitored during administration.

Risk of respiratory depression may occur with overdosage or too rapid a rate of administration. Maintain adequate oxygenation and ventilation

Risks of using ketamine alone for procedures of the pharynx, larynx, or bronchial tree Pharyngeal and laryngeal reflexes are not suppressed with ketamine when it is used alone. Avoid use as a sole anesthetic agent in surgery or diagnostic procedures of the pharynx, larynx, or bronchial tree. Muscle relaxants may be required.

Pediatric neurotoxicity Studies conducted in young animals and children suggest repeated or prolonged use of general anesthetic or sedation drugs in children younger than 3 years may have negative effects on their developing brains. Discuss with parents and caregivers the benefits, risks, timing, and duration of surgery or procedures requiring anesthetic and sedation drugs.

Drug-induced liver injury is associated with the administration of this medicine.

Increase in cerebrospinal fluid pressure An increase in intracranial pressure has been reported following the administration of this medicine. Patients with elevated intracranial pressure should be in a monitored setting with frequent neurologic assessments.

FDA warning. The FDA released a warning on October 10, 2023, about about potential risks associated with compounded ketamine products, including oral formulations, for the treatment of psychiatric disorders, as they have not been evaluated for safety, effectiveness, or quality prior to marketing. When these products are used at home, there is an additional risk because onsite monitoring by a healthcare provider is **not** available

Before taking this medicine

You should not be treated with ketamine if you are allergic to it or if you have untreated or uncontrolled hypertension ([high blood pressure](#)).

Tell your doctor if you have ever had:

- [heart disease](#);
- high blood pressure;
- [liver disease](#);
- [alcoholism](#); or
- if you drink large amounts of alcohol.

Pregnancy and breastfeeding

Tell your doctor if you are pregnant or breastfeeding.

Anesthesia may affect brain development in a young child or unborn baby (when used in the mother), leading to learning

or behavior problems later in life. Long surgeries or repeated procedures pose the highest risks.

Anesthesia may still be necessary for a life-threatening condition, medical emergency, or surgery to correct a birth defect. Your doctor can inform you about all medicines given during a surgery or procedure.

Ask a doctor if it is safe to breastfeed shortly after you receive ketamine.

How should I receive Ketamine?

Ketamine is injected into a muscle or a vein when used medically. A healthcare provider will give you this injection.

Your breathing, blood pressure, oxygen levels, and other vital signs will be watched closely.

You may feel strange or confused when you awake from anesthesia. Tell your caregivers if these feelings are severe or unpleasant.

Ketamine dosing information

Usual Adult Ketamine Dose for Anesthesia:

Intravenous injection (IV)

Induction: 1 to 4.5 mg/kg IV; alternatively, 1 to 2 mg/kg IV at a rate of 0.5 mg/kg/min; (2 mg/kg dose provides 5 to 10 minutes of surgical anesthesia within 30 seconds)

Maintenance: The maintenance dose should be adjusted according to the patient's anesthetic needs and whether an additional anesthetic is employed. Increments of one-half to the full induction dose may be repeated as needed for maintenance of anesthesia.

Intramuscular injection (IM)

Induction: 6.5 to 13 mg/kg IM; (9 to 13 mg/kg IM provides 12 to 25 minutes of surgical anesthesia)

Maintenance: The maintenance dose should be adjusted according to the patient's anesthetic needs and whether an additional anesthetic is employed. Increments of one-half to the full induction dose may be repeated as needed for maintenance of anesthesia.

Comments: This drug should be administered slowly over a period of 60 seconds (more rapid administration may result in [respiratory depression](#) and enhanced pressor response).

The larger the total dose, the longer the complete recovery will be.

Because of rapid induction following the initial IV injection, the patient should be in a supported position during administration.

Usual Pediatric Ketamine Dose for Anesthesia:

16 years and older: See adult dosing.

For more detailed dosing information, click on the link below.

 [Detailed Ketamine dosage information](#)

What happens if I miss a dose?

Ketamine is used as a single dose and does not have a daily dosing schedule.

What happens if I overdose?

In a medical setting, an overdose would be treated quickly.

What should I avoid after receiving ketamine?

Ketamine may impair your thinking or reactions for several hours. Avoid driving or operating machinery for at least 24 hours after you receive ketamine.

What other drugs will affect ketamine?

It may take you longer to recover from anesthesia if you use other drugs that make you sleepy or slow your breathing. This includes opioid medication, a sleeping pill, a muscle relaxer, or medicine for [anxiety](#) or [seizures](#).

Other drugs may affect ketamine, including prescription and over-the-counter medicines, [vitamins](#), and [herbal products](#). Tell your doctor about all other medicines you use.

Tell your doctor if you take theophylline, aminophylline, sympathomimetic medications, vasopressin, benzodiazepines, opioid analgesics, or other CNS depressants.

Not all possible interactions are listed here.

 [Ketamine drug interactions](#) (more detail)

Does ketamine interact with my other drugs?

Enter medications to view a detailed interaction report using our [Drug Interaction Checker](#).

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Add

Storage

Ketalar injection should be stored at 20°C to 25°C (68°F to 77°F)

References

1. [Alcohol and Drug Foundation: Ketamine](#)
2. [Food and Drug Administration \(FDA\) Ketalar Product Label](#)
3. [Ketamine for the treatment of mental health and substance use disorders: comprehensive systematic review](#)
4. [Ketamine Hydrochloride \(Monograph\)](#)
5. [FDA warns patients and health care providers about potential risks associated with compounded ketamine products, including oral](#)

formulations, for the treatment of psychiatric disorders

6. [Extended-release ketamine tablets for treatment-resistant depression: a randomized placebo-controlled phase 2 trial](#)
7. [Efficacy of ketamine therapy in the treatment of depression](#)
8. [Ketamine and esketamine for treating unipolar depression in adults: Administration, efficacy, and adverse effects](#)

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DRUG STATUS

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 Risk data available

CSA Schedule*

3 Moderate abuse potential



Approval History

 Drug history at FDA



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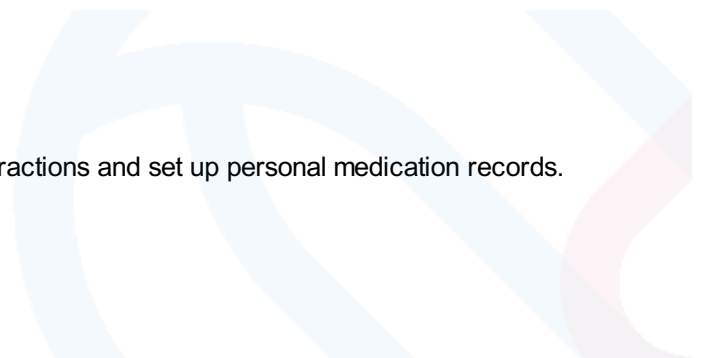
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