

Ketamine is a dissociative anesthetic used medically for induction and maintenance of anesthesia. It is also used as a treatment for depression, a pain management tool, and sometimes as a recreational drug. Ketamine is a novel compound that was derived from phencyclidine in 1962, in pursuit of a safer anesthetic with fewer hallucinogenic effects.

- At anesthetic doses, ketamine induces a state of "dissociative anesthesia", a trance-like state providing pain relief, sedation, and amnesia. The distinguishing features of ketamine anesthesia are preserved breathing and airway reflexes, stimulated heart function with increased blood pressure, and moderate bronchodilation. At lower, sub-anesthetic doses, ketamine is a promising agent for pain and treatment-resistant depression. However, as with many antidepressants, the results of a single administration of ketamine wane with time. The long-term effects of repeated use are largely unknown, and are an area of active investigation.

Liver and urinary toxicity have been reported among regular users of high doses of ketamine for recreational purposes. Ketamine is an NMDA receptor pore blocker and that accounts for most of its actions, except the antidepressant effect, the mechanism of which is a matter of much research and debate.

Medical uses:

1-Anesthesia : the use of ketamine in anesthesia reflects its characteristics. It is a drug of choice for short-term procedures when muscle relaxation is not required.

2-Pain: ketamine infusions are used for acute pain treatment in emergency departments and in the perioperative period in individuals with refractory pain. The doses are lower than those used for anesthesia

3-Depression: ketamine is a robust and rapid-acting antidepressant, although its effect is transient. Intravenous ketamine infusion in treatment resistant depression may result in improved mood within 4 hours reaching the peak at 24 hours.

Mechanism of action:

Pore blocking of the NMDA receptor is responsible for the anesthetic, analgesic, and psychotomimetic effects of ketamine. Blocking of the NMDA receptor results in analgesia by

preventing central sensitization in dorsal horn neurons; in other words, ketamine's actions interfere with pain transmission in the spinal cord.

Side effects

- 1- Dysphoria
- 2- tonic-clonic movements (greater than 10% of people) and rarely hypertonia
- 3- Laryngospasm
- 4- Vomiting can be expected in 5–15% of the patients
- 5- Urinary toxicity occurs primarily in people who use large amounts of ketamine routinely

Contraindications

Main contraindications for ketamine:

- Severe cardiovascular disease such as unstable angina or poorly controlled hypertension
- Increased intracranial or intraocular pressure. Both of these contraindications are controversial
- Poorly controlled psychosis
- Severe liver disease such as cirrhosis
- Pregnancy
- Active substance use disorder (for serial ketamine injections)
- Age less than 3 months

Interactions

Ketamine potentiates the sedative effects of propofol and midazolam. Naltrexone potentiates psychotomimetic effects of a low dose of ketamine, while lamotrigine and nimodipine decrease them. Clonidine reduces the increase of salivation, heart-rate and blood-pressure during ketamine anesthesia and decreases the incidence of nightmares.

Clinical observations suggest that benzodiazepines may diminish the antidepressant effects of ketamine. It appears most conventional antidepressants can be safely combined with ketamine.

