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Editorial

Role of Ketamine in Emergency Department

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EDITORIAL

Ketamine is a sedative that emergency physicians have typically used for intubation and procedural sedation. Few might have predicted ketamine's vast clinical utility when it was first used in 1970. Ketamine is a dissociative sedative and analgesic N-methyl-D-aspartate receptor antagonist that is often used for procedure sedation and induction. Ketamine has also been investigated as a potential treatment for severe agitation/excited delirium and analgesia. Calvin Stevens of Parke-Davis Laboratories in Detroit, Michigan, invented ketamine in 1962. Ketamine was first used in veterinary medicine as a sedative.

Metabolism

Ketamine metabolism is characterized by low plasma protein binding (around 10%–30%) Ketamine has a far wider dispersion than thiopental due to its five-fold higher lipo solubility. Ketamine is metabolized predominantly by liver enzymes and eliminated in the urine after demethylation, hydroxylation, and glucuronidation. This process involves several cytochrome P450 systems, including CYP2B6, CYP3A4, and others. This is crucial to remember because many medicines that inhibit or stimulate the P450 system have the potential to interfere with ketamine metabolism.

Route of administration

Ketamine can be delivered in a variety of ways, including intravenous (IV), intramuscular (IM), subcutaneous (SQ), oral (PO), intranasal (IN), epidural, rectal (PR), and topical. Ketamine is most usually administered as an IV drug, with an onset time of roughly 15 to 30 seconds. The onset of IM administration takes about four minutes and lasts for 15 to 30 minutes. When compared to IV, dose is frequently doubled when given IM. Intranasal (IN) ketamine injection is appealing because it is less invasive, quickly absorbed, and does not undergo first-pass metabolism. As a result, it's simple to utilize in children, obviating the requirement for difficult and unpleasant IV access. Because ketamine comes in three concentrations: 10 mg/mL, 50 mg/mL, and 100 mg/mL, it's crucial to know which one is being used when giving it intramuscularly.

Ketamine for the treatment of acute pain

In the emergency room, acute pain is a common complaint. Ketamine possesses analgesic characteristics, which are most likely due to its regulation of opioid receptors as well as a variety of other less well-defined receptors. Ketamine is a third-line drug for pain treatment after traditional analgesics have failed due to its analgesic characteristics. Ketamine can be administered intravenously, intramuscularly, intravenously, and even trans-dermally in the treatment of chronic neuropathic pain. Ketamine has been explored in the treatment of musculoskeletal pain, sickle cell disease, migraines, long bone fractures, perioperative pain, pain related with painful procedures including incision and drainage, and persistent refractory pain in opiate-tolerant individuals. 48 Additionally, when opioids, Non-Steroidal Anti-Inflammatory medications (NSAIDs), amitriptyline, and medicines like gabapentin fail to reduce cancer-related pain, ketamine has been well established as a treatment option.

Side effects

Ketamine has been proven to enhance the occurrence and severity of Post-Operative Nausea and Vomiting (PONV). One of ketamine's advantages is that if administered slowly, it has little effect on central respiratory drive, while fast IV administration can produce transitory apnea. Ketamine causes an increase in salivary secretions, which can lead to laryngospasm. This could be due to a partial blockage of the airway, which can be cleared with simple airway motions. Because secretions can be expected, a tiny dose of atropine (0.01 mg/kg) should be given in addition. Ketamine's NMDA-antagonistic effect causes creative, dissociative states, and psychotic symptoms like schizophrenia when used in sub-anesthetic doses, as well as substantially affecting semantic and episodic memory. It can create a floating sensation, vivid pleasant dreams, nightmares, hallucinations, and delirium when used as an anesthetic. Patients over the age of 16, women, shorter operating procedures, and those receiving big dosages, especially when given fast, are more likely to experience these side effects.

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