International Journal of Health Policy, Economics, and Management

https://www.harrisonacademicpress.com/index.php/IJHPEM

Vol 1, Issue 1, 2026

Ketamine Tolerance Symptoms: A Review

1. **Y. Ratnakumari*,** Asso. Professor, DEPT OF PHARMACOGNOSY

2. Md. Jumana, Asst. Professor, DEPT OF Pharmaceutical Analysis

3. P. Rambabu, Asst. Professor, DEPT OF PHARMACEUTICS

4. Ch. Supraja, Asst. Professor, DEPT OF Pharmaceutical Analysis

5.**Dr.M. SREENIVASULU**, PRINCIPAL, NARAYANA PHARMACY COLLEGE

[1,2,3,4,5] NARAYANA PHARMACY COLLEGE, CHINTHA REDDY PALEM, NELLORE

Abstract

Drug tolerance is a pharmacological phenomena that happens when the body's response to a medication diminishes with repeated use, requiring higher doses to have the same therapeutic benefit (Editor). The development of tolerance is mainly caused by two factors: 1. Pharmacokinetic: Because of its quick metabolism, this reduces the drug's effectiveness. 2. Pharmacodynamically, adaptive changes take place, such as an increase or decrease in the number of receptors, as is the case with morphine.

Introduction

In recent years, ketamine has become more and more popular as a medication to treat pain, depression, and other human ailments. The substance gained notoriety for being used in nightclubs and the rave culture, which raised serious concerns due to its potent effects. When administered by qualified medical personnel, ketamine therapy is a secure and efficient way to manage these illnesses. Ketamine addiction may result from misuse, however, since it can cause tolerance and dependency. We'll talk about how ketamine usage has expanded across society and how to control ketamine tolerance in this blog.Similar to tolerance, the depletion of mediators inside the presynaptic membrane of nerve terminals causes tachyphylaxis, which causes the drug's impact to rapidly diminish. This depletion is caused by brief gaps between medication administrations. However, this effect persists even when dosage is increased.

[1] Imagine that a 2-month-old child who weighed 5 kg, had a lymphovenous malformation, and had previously had ketamine-assisted nonoperative room anaesthesia (NORA) was scheduled for a contrast-enhanced computed tomography thorax. The child was given ketamine after receiving injections of midazolam (0.1 mg/kg) and glycopyrrolate (4 g/kg) in compliance with the ASA monitoring guidelines for NORA. The patient first received an intravenous infusion of 1 mg/kg of ketamine, but he or she continued to move, cry, and remain awake. At a dose of 4 mg/kg (20 mg) of ketamine, the patient was not sufficiently sedated; thus, incremental dosing was maintained until the intended effect was obtained. The infant woke up and began to wail after 20 minutes, but there were no negative side effects. Ketamine acts as a receptor antagonist for N-methyl-D-aspartate and

its metabolites are excreted in urine. About 80% of the total is removed as conjugates of glucuronic acid and hydroxylated ketamine metabolites, followed by dehydronorketamine (16%), norketamine (2%), and unmetabolized potash (2%). After five days, the parent drug norketamine and 51% of the injected radioactivity were found in the urine, according to research utilising tritium-labeled ketamine.

Only 20% of the sample contained 6-dehydronorketamine. This might indicate that undiscovered ketamine metabolites, each with a distinct chemical structure and set of pharmacological actions, are still out there. Repeated ketamine injections may extend its elimination period by 11–14 days.[2] within When the cyclohexanone ring in ketamine is dehydrogenated, 5, 6-dehydronorketamine is created; this molecule has a half-life of 6–10 days. In rat liver microsomes, ketamine has been shown to activate many hepatic P450 isoforms. The isoforms 1A, 2B, 2E1, and 3A are among these. A single dosage of ketamine prevents cytochrome P450 (CYP) 3A4, an enzyme that degrades erythromycin by N-demethylation, from doing its job. However, it should be noted that frequent exposure to ketamine might actually increase the activity of CYP enzymes, much as ethanol does. All of the aforementioned mechanisms support the theory that tolerance may develop with prolonged ketamine use, requiring higher doses to provide the intended therapeutic effect. The presence of unidentified metabolites, the overexpression of ketamine-metabolizing enzymes, the prolonged presence of metabolites like 5,6-dehydronorketamine, and the repeated use of ketamine for sedation are a few of these processes. Therefore, higher doses are required to get the therapeutic effects of ketamine.

Statement of the patient's agreement

The authors acknowledge that they have gathered the required patient authorisation documentation by signing this form. The form certifies that the patient or patients have consented to the publishing of their images and other clinical information in a peer-reviewed journal. The patients are aware that their names and initials will not be published, despite the fact that every effort will be made to maintain their secrecy. The papers published in this open access journal are made available under the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License. This implies that there is no cost associated with using the articles in any form, including remixing and altering them. All they have to do is license their own works under the same conditions and provide due credit.

Risks Of Ketamine Tolerance:

Although ketamine addiction is not always a problem, this substance may nevertheless have a lot of negative consequences and painful side effects.An individual may experience what is known as a "K-Hole" while taking high amounts of ketamine. Most people consider this to be one of the most disagreeable side effects of ketamine.During a K-Hole, a person may have delayed breathing, a slowed heart rate, and difficulty moving or speaking. The more ketamine a person consumes, the greater the chance of getting a K-Hole. A person puts himself at risk for a K-Hole when they develop a tolerance and continuously take more.

Referances:

1."General and Clinical Pharmacology" by Katzung BG, published in 2012 by McGraw-Hill Medical in New York by CZELEJ.

2. Dinis-Oliveira RJ. A toxicological approach to ketamine metabolism and metabolomics. "Forensic Science Research" published in 2017 with the DOI 2: 2ç10.

3. Max MB, Byas-Smith MG, Gracely RH, et al. Intravenous infusion of the NMDA antagonist, ketamine, in chronic post-traumatic pain with allodynia: a double-blind comparison to alfentanil and placebo. Clin Neuropharmacol 1995;18(4): 360–368.

4. Persson J, Axelsson G, Hallin RG, et al. Beneficial effects of ketamine in a chronic pain state with allodynia, possibly due to central sensitization. Pain 1995;60(2):217–222.

5. Gammaitonie A, Gallagher RM, Welz-Bosna M. Topical ketamine gel: possible role in treating neuropathic pain. Pain Med 2001;1(1):97–100.

6. Haines DR, Gaines SP. N of 1 randomised controlled trials of oral ketamine in patients with chronic pain. Pain 1999;83(2):283–287.

7. Enarson MC, Hays H, Woodroffe MA. Clinical experience with oral ketamine. J Pain Symptom Manage 1999;17(5):384–386.

8. Fisher K, Hagen NA. Analgesic effect of oral ketamine in chronic neuropathic pain of spinal origin: a case report. J Pain Symptom Manage 1999; 18(1):61–66.

9. Mercadante S, Arcuri E, Tirelli W, et al. Analgesic effect of intravenous ketamine in cancer patients on morphine therapy: a randomized, controlled, double-blind, cross-over, double-dose study. J Pain Symptom Manage 2000;20(4):246–252.

10. Lauretti GR, Gomes JMA, Reis MP, et al. Low doses of epidural ketamine or neostigmine, but not midazolam, improve morphine analgesia in epidural terminal cancer pain therapy. J Clin Anesth 1999;11: 663–668.

11. Fine PG. Low-dose ketamine in the management of opioid nonresponsive terminal cancer pain. J Pain Symptom Manage 1999;17(4):296–300.