International Journal of Medicine Research
ISSN: 2455-7404; Impact Factor: RJIF 5.42
Received: 06-06-2019; Accepted: 09-07-2019
www.medicinesjournal.com
Volume 4; Issue 3; July 2019; Page No. 97-99

A comparison of ketofol with propofol for sedoanalgesia for dilatation and evacuation: A randomized controlled trial

Dr. Radika D[1], Dr. Ranjith KB[2*], Dr. KV Chidananda[3]
[1] Assistant Professor, Department of Anesthesiology, KVG Medical College and Hospital, Sullia, Karnataka, India
[2] Assistant Professor, Department of General Surgery, KVG Medical College and Hospital, Sullia, Karnataka, India
[3] Professor, Department of Surgery, KVG Medical College and Hospital, Sullia, Karnataka, India

Abstract
Ketofol is widely used for medical evacuation and patient dilatation due to the sedative and analgesic properties of the individual components. Ketofol is made from ketamine and propofol. Ketofol is also used to treat severe depressions. For evacuation and ventilation patient treatment, a moderate spectrum of ketofol is required as this induces moderate sedation and anesthesia (Pandey, *et al*. 2017). In this study, 32 female patients underwent dilatation and evacuation treatment. These women were divided into two categories upon which a double-blind, randomized controlled trial was done on the groups, one with ketamine and the other group with propofol analgesia. A postoperative analysis on was done to determine the sedoanalgesia properties of ketamine and propofol.

Keywords: ketofol, ketamine, propofol, sedoanalgesia, postoperative analysis, amnesia, fentanyl, cyclohexanone, Gama-aminobutyric acid neurotransmitters

Introduction
Ketofol has over time been used by clinicians to treat patients with depressive disorders or those with severe health conditions (Amornyotin, 2014) [1]. For instance, this drug is often used under emergency treatment or those with terminal illnesses. Physicians handling such patients need to be extra-confident and certain that the drugs they administer to patients are safe and effective, especially during sedative and analgesic (PSA) treatment. This treatment is helpful to patients in that it provides the desired level of sedation while also reducing the pain which the patient experiences (Amornyotin, 2014) [1]. Moreover, ketofol maximize amnesia while also limiting patient anxiety, thus reducing the possible adverse effects of the drug, controlling the patient's behavior, which makes the patient have a relatively stable respiratory and cardiovascular state. In most cases, physicians use only a moderate spectrum of ketofol to induce sedation (Pandey, *et al*. 2017) [9]. This study compares how varying the proportions of ketamine and propofol affected the level of sedation and analgesia.

Research Objectives
- To determine how variations in ketamine and propofol compositions in ketofol affect sodoianalgesic properties of ketofol.
- To determine the duration which each of the drugs take to induce sedation into a patient.
- To compare the pain-relieving properties of ketofol and propofol.

Background
Ketofol is made by the clinical combination of propofol and ketamine. To achieve the desired proportional concentration, the two drugs are put together in a syringe in different determined proportions (Dal *et al*. 2014) [4]. Ketamine is a commonly abused drug which is derivative of cyclohexanone and which has anesthetic and analgesic properties. However, recent scientific studies have established that ketamine can provide the most significant breakthrough for psychotherapy medications due to its mode of action, which enables it to combat cases of severe depression (Kurdi, & Deva, 2015) [8]. On the other hand, propofol is a drug which is administered intravenously to induce sedation during monitored anesthesia care; thus it can be applied in cases which require combined regional anesthesia and sedation and general anesthesia (Amornyotin, Chalayonnawin & Kongphlay, 2012) [2]. It is also used for sedation of patients in intensive care units who require specialized treatment procedures or which are under mechanical ventilation.
Combined action of the individual properties of ketamine and propofol make ketofol capable of evacuation and dilatation. For medical evacuation or dilatation, only a short and regulated moderate sedation and analgesia are necessary (Ghadami *et al*. 2013) [6]. Patients with less severe conditions may be given a minimal spectrum of ketofol, whereas those with more severe conditions may get either deep spectrum or general anesthesia spectrum. Also, the ability of ketamine to take over the pain receptors has motivated the use of ketamine as an instant pain and stress reliever on clinical setups. Perhaps this explains why ketamine is a widely abused drug, especially by people with depressive disorders (Ghadami *et al*. 2013) [6]. Despite ketofol being an effective sedative drug, the optimal proportions of propofol and ketamine, as well as the right concentration of the drug, is yet to be determined.

Methodology
A prospective double-blind study was conducted on a sample of 32 female patients from different health centers.

These patients were undergoing evacuation and dilatation treatments. The patients were all injected with fentanyl with a concentration of 2micrograms per kilogram. The women were divided into groups A (group ketofol) and B (group propofol). The group A sample were administered a bolus dose after which they received aliquot ketofol (1:1) injections. The group B sample also underwent a similar procedure but with an infusion of propofol. This mixture was achieved by applying the pharmacodynamic and pharmacokinetic parameters to stimulate the concentration of the drugs under a fixed ratio of equal proportions of propofol and ketamine. In both cases, the patients were observed and their levels of sedation evaluated at the beginning and the end of the study using the Ramsay sedation scale. The patients were given a 30-minute rest after which a postoperative analysis was done on every patient from both groups to determine if they felt any pain.

Results

For both groups, the study did not identify any significant difference between the start of the study and in the course of the sedation process. Group A recorded lower scores on the Ramsay Sedation Scale (the scores tend towards 1). Group B patients also recorded similar scores. The postoperative results established group A patients felt less pain relative to group B patients as summarized in the table below.

Table 1

Test	Group A	Group B
Sedation Score	+1	+1
Analgesia	Yes	No

Discussion

A mixture of racemic ketamine and propofol (commonly known as ketofol) has gotten popular applications for short procedural clinical analgesia and sedation of patients, especially those which are expected to undergo emergency care (Ayatollahi *et al*. 2016) [3]. This is because the ketamine-propofol mixture (ketofol) has the characteristic properties of ketamine and propofol; thus, it can reduce anxiety in the patient and also maximize amnesia. Furthermore, ketofol is efficient for controlling the patient's movement and behavior and minimizing pain during the operation and after administration (David & Shipp, 2011) [5]. This explains why ketofol is a safe and effective drug for analgesia and inflammation.

For medicinal use, only a moderate spectrum is needed for patients, and this should be administered for a strictly controlled procedure which takes the least time possible (Hegazy, 2016) [7]. Ketofol administration under this spectrum is correlative with 'conscious sedation' whereby the patient is quite responsive to the treatment situation (David & Shipp, 2011) [5]. Moderate spectrum is used for patients who are undergoing simple procedures which need analgesia or muscle relaxation such as reduction of a dislocated shoulder. In most cases, the cardiovascular functions of such patients never affected (Ramdev *et al*. 2016) [10]. Spontaneous ventilation may sometimes be needed. Upon administration of ketofol, the chemical component in ketamine, 2-(2-Chlorophenyl)-2-(methylamino) cyclohexanone, bonds to the N-methyl D-aspartate receptors thus inhibiting any form of depressive disorder thus the medical advantages when used in a controlled environment (Amornyotin, 2014) [1]. By taking over these receptors, ketamine blocks any transmission of stimulus impulses to the brain, thus preventing interpretation of any perceived stimulus. It is for this reason that group A patients (group ketofol) reported less pain and analgesia (Hegazy, 2016) [7].

Propofol, on the other hand, is used for sedation, especially for patients with severe depressive disorder. Also, emergency physicians use propofol on patients to induce different levels of sedation depending on the patient's condition (Yarmus *et al*. 2013) [11]. The active component within propofol, 2, 6-diisopropyl phenol induces an inhibitory action on gama-aminobutyric acid neurotransmitters (Amornyotin, 2014) [1]. Thus explains the sedative properties of propofol.

When administered in the ratio of 1:1, there was no apparent sedative effect of ketofol as it was lower than the recommended ration for boluses especially when the patient is under procedures which take a short time. According to Amornyotin (2014) [1], the most effective ratio for combining ketamine to propofol in ketofol should be 4:1, whereby for a 20mm cylinder, there is 40mg of ketamine whereas the quantity of propofol in such as mixture is 160mg.

Conclusion

From this study, it was established that a moderate spectrum of ketofol exhibited sedative characteristics, especially when administered for patients with short procedures. Thus, it can be used to sedate patients undergoing short procedures such as evacuation and dilatation. Also, ketofol has better postoperative analgesic characteristics relative to propofol.

References

1. Amornyotin S. Ketofol a combination of ketamine and propofol. J Anesth Crit Care. 2014; 1:00031.
2. Amornyotin S, Chalayonnawin W, Kongphlay S. PWE-105 Clinical efficacy of the combination of propofol and ketamine (ketofol) for deep sedation for colonoscopy. Gut. 2012; 61(Suppl 2):A339-A340.
3. Ayatollahi V, Vafaiyan M, Hatami M, Behdad S. Two different concentrations of ketofol for procedural sedation and analgesia in closed reduction of nasal fracture. Journal of Craniofacial Surgery. 2016; 27(4):996-1000.
4. Dal T, Sazak H, Tunc M, Sahin S, Yilmaz A. A comparison of ketamine-midazolam and ketamine-propofol combinations used for sedation in the endobronchial ultrasound guided transbronchial needle aspiration: a prospective, single blind, randomized study. J Thorac Dis. 2014; 6(6):742-751.
5. David H, Shipp J. A randomized controlled trial of ketamine/propofol versus propofol alone for emergency department procedural sedation. Ann Emerg Med. 2011; 57(5):435- 441.
6. Ghadami Yazdi A, Ayatollahi V, Hashemi A, Behdad SH, Ghadami Yazdi E. Effect of two different concentrations of propofol and ketamine combinations (Ketofol) in pediatric patients under lumbar puncture or bone marrow aspiration. Iranian J Pediatr Hematol Oncol. 2013; 3(1):187-192.
7. Hegazy AAT. Comparative Study between Ketofol versus Propofol Anesthesia for Uterine Cervical Dilation and Currettage. Al-Azhar Med. J. 2016; 45(2): 287-295.

8. Kurdi MS, Deva RS. A comparison of two different proportions of ketofol with fentanyl-propofol for sedoanalgesia for tubal sterilization by minilaparotomy: A randomized double-blind trial. Journal of Obstetric Anaesthesia and Critical Care. 2015; 5(2):84.
9. Pandey S, Gupta S, Choudhary B, Sakhare VJ. A comparative evaluation of ketamine-propofol versus fentanyl-propofol in total intravenous anaesthesia-a double blind randomised clinical trial. Journal of evolution of medical and dental sciences-jemds. 2017; 6(54):4094-4097.
10. Ramdev B, Sharma DK, Sharma SR, Sodhi GS. A Comparative Evaluation of Propofol-Ketamine and Propofol-Fentanyl As TIVA Techniques In Terms Of Haemodynamic Variables And Recovery Characteristics In Minor Surgeries. IOSR-JDMS. 2015; 14(4):19-26.
11. Yarmus LB, Akulian JA, Gilbert C, Mathai SC, Sathiyamoorthy S, Sahetya S. *et al*. Comparison of moderate versus deep sedation for endobronchial ultrasound transbronchial needle aspiration. Annals of the American Thoracic Society. 2013; 10(2):121-126.