

Use of Intravenous Ketamine in Gastrointestinal Endoscopy

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ABSTRACT

Ketamine, an old intravenous anesthetic, is a non-narcotic drug. It principally works by non-competitive antagonist at the N-methyl-D-aspartate (NMDA) receptors. Ketamine has several properties of the ideal anesthetic agent. Therefore, its properties are interesting in various clinical settings including gastrointestinal endoscopy, although it could produce some adverse effects. This present short review aims to pronounce the use of intravenous ketamine for gastrointestinal endoscopic procedure.

Key words: Ketamine, Gastrointestinal endoscopy, Clinical.

INTRODUCTION

Several sedative and analgesic drugs are frequently utilized for sedation in gastrointestinal endoscopic (GIE) procedures. Normally, physicians used these drugs by the combination technique.^[1] In non-anesthetic personnel, the most common sedoanalgesic drugs used for this procedure are midazolam and fentanyl. Midazolam has the rapid and short duration of action, making it is a common drug for the ambulatory cases. In addition, fentanyl is a strong synthetic opioid with quick onset and short duration of action.^[2] Ketamine is an anesthetic drug. It acts principally as a noncompetitive N-methyl-d-aspartate receptor antagonist. However, ketamine could create some unfavorable adverse effects.^[3]

Interestingly, ketamine is not a cardiovascular depressor agent. Hence, it commonly uses in the hypovolemic patients and patients with hemodynamic instability. Furthermore, ketamine conserves the cardiovascular function. Its cardiovascular effects are usually associated with tachycardia, hypertension and increased cardiac output. Additionally, ketamine has minimal effect on the respiratory system. The airway reflexes and airway muscle tone are still conserved. However, ketamine induces saliva and mucous secretions which can make some problems.^[3] It also owns some adverse psychological effects.

Thus, a combination of ketamine and other sedative drugs has numerous benefits including cardiovascular stability, presence of non-respiratory depression, and postprocedural analgesia. Many studies have been established the clinical usefulness of the combination of ketamine and other sedative drugs.

For GIE procedure, ketamine is not generally used as a single agent. Therefore, ketamine in combination with sedatives and/or analgesics is usually employed. A combination of ketamine and midazolam administered to children undergoing upper GIE procedure was safe and effective. These procedures could be quite comfortable when using this combination technique. However, the adverse effects related to ketamine were detected during the recovery period.^[4] Because of an analgesic property of ketamine, the combination of ketamine, midazolam and propofol for sedation in colonoscopy could be used effectively and safely. Moreover, the total use of propofol in this combination regimen was significantly lower than the combination of fentanyl, midazolam and propofol.^[5]

In combination method, a combination of ketamine and propofol is ketofol. Several studies of ketofol for GIE procedures have been published. For anesthetic personnel, propofol is commonly used for sedation in various procedures even in GIE procedures. Propofol has anxiolytic, hypnotic and antiemetic properties. The combination of propofol with

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ketamine has numerous advantages.^[2,6] Our previous study confirmed the clinical efficacy of the combination of propofol and ketamine for sedation in adult patients underwent colonoscopic procedure.^[7] The study demonstrated that the combination technique had significantly higher efficacy than the single use of propofol. The ketofol regimen probable contributed to better sedation with lower sedation-related adverse effects and higher patient satisfaction. Many studies recommended that a 1:3 ratio of ketamine and propofol was the best combination for the intermittent dosing.^[8] The ratio higher than 1:3 resulted in prolonged recovery phase.^[9]

Ketodex is a combination of ketamine and dexmedetomidine. Dexmedetomidine is a specific central alpha 2-adrenergic agonist. It has anxiolysis, sedation and analgesia properties. The use of ketodex for sedation in GIE procedures continues to be recognized. A combination of ketamine and dexmedetomidine has good analgesic, minimal adverse effects and no cardiorespiratory depression.^[10,11] The previous study demonstrated that a combination of ketamine and dexmedetomidine for upper GIE procedure in adults was clinically safe and effective with good recovery profile.^[12] Goyal and coworkers compared the efficacy and safety of a combination of propofol and fentanyl with a combination of ketamine and dexmedetomidine for endoscopic retrograde cholangiopancreatography (ERCP) procedure. The study showed that there were significantly fewer sedation-related adverse effects. However, the recovery time in the ketamine and dexmedetomidine group was longer than in the propofol and fentanyl group.^[13] Additionally, ketamine as an additional drug in the propofol, midazolam and pentazocine regimen for ERCP procedure increased the efficacy and safety of prolonged deep sedation. This regimen also reduced propofol requirement.^[14] However, ketamine with propofol could decrease the occurrence of gag reflex lesser than dexmedetomidine with propofol in the patients undergoing upper GIE procedure.^[15]

CONCLUSION

Ketamine, an old intravenous anesthetic drug. It is a useful agent for sedation in gastrointestinal endoscopic procedures. However, it can create the unwanted and psychomimetic side effects. Therefore, a single use of ketamine is not recommended. Although the incidence of adverse effects appears to be minimal at a subanesthetic dose, a combination of ketamine with sedoanalgesic drugs might be a beneficial adjunct in these procedures.

ABBREVIATIONS

GIE: Gastrointestinal endoscopy; NMDA: N-methyl-D-aspartate; ERCP: Endoscopic retrograde cholangiopancreatography

REFERENCES

1. Amornyotin S. Intravenous sedation techniques for gastrointestinal endoscopy. *J Gastroenterol Hepatol Res* 2016;5:2050-7.
2. Amornyotin S. Sedative and analgesic drugs for gastrointestinal endoscopic procedure. *J Gastroenterol Hepatol Res* 2014;3:1133-44.
3. Amornyotin S. Ketamine: pharmacology revisited. *Intern J Anesthesiol Res* 2014;2:42-4.
4. Akbulut UE, Saylan S, Sengu B, Akcali GE, Erturk E, Cakir M. A comparison of sedation with midazolam-ketamine versus propofol-fentanyl during endoscopy in children: a randomized trial. *Eur J Gastroenterol Hepatol* 2017;29:112-8.
5. Kayaalti S, Kayaalti O. Comparison of ketamine-midazolam-propofol combination and fentanyl-midazolam-propofol combination for sedation in colonoscopy. *East J Med* 2019;24:155-62.
6. Amornyotin S. Ketofol: a combination of ketamine and propofol. *J Anesth Crit Care Open Access* 2014;1:00031.
7. Amornyotin S, Kongphlay S. Clinical efficacy of combination of propofol and ketamine (ketofol) for deep sedation in colonoscopic procedure. *J Gastroenterol Hepatol Res* 2015;4:1689-93.
8. Coulter FLS, Hannam JA, Anderson BJ. Ketofol simulations for dosing in pediatric anesthesia. *Pediatr Anesth* 2014;24:806-12.
9. Coulter FLS, Hannam JA, Anderson BJ. Ketofol dosing simulations for procedural sedation. *Pediatr Emerg Care* 2014;30:621-30.
10. Amornyotin S. Dexmedetomidine in gastrointestinal endoscopic procedures. *World J Anesthesiol* 2016;5:1-14.
11. Amornyotin S. Use of a combination of ketamine and dexmedetomidine (Ketodex) in different clinical cases. *J Addict Med Ther Sci* 2020;6:041-4.
12. Bali BK, Patel A. Study of KETODEX; combination of dexmedetomidine and ketamine in upper gastrointestinal scopy in adults: observational study. *J Med Sci Clin Res* 2017;5:23986-93.
13. Goyal R, Hasnain S, Mittal S, Shreevastava S. A randomized, controlled trial to compare the efficacy and safety profile of a dexmedetomidine-ketamine combination with a propofol-fentanyl combination for ERCP. *Gastrointest Endosc* 2016;83:928-33.
14. Mukhopadhyay S, Niyogi M, Sarkar J, Mukhopadhyay BS, Halder SK. The dexmedetomidine "augmented" sedato analgesic cocktail: an effective approach for sedation in prolonged endoscopic retrograde cholangio-pancreatography. *J Anaesthesiol Clin Pharmacol* 2015;31:201-6.
15. Abbas I, Hassanein A, Mokhtar M. Effect of low dose ketamine versus dexmedetomidine on gag reflex during propofol based sedation during upper gastrointestinal endoscopy. A randomized controlled study. *Egyptian J Anaesth* 2017;33:165-70.

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