

Role of low-dose ketamine pre-treatment to reduce propofol injection pain in intravenous route

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Abstract:

Background: Propofol (2,6-diisopropylphenol) is a drug of choice for short procedures as it results in quicker recovery and earlier return of psychomotor function as compared to thiopentone or methohexital. Propofol possesses almost all the properties of an ideal anaesthetic agent but causing pain or discomfort on injection. The aim of the study was to assess the effectiveness of ketamine pretreatment in reducing the occurrence of intravenous propofol injection pain.

Objective: This study was designed to evaluate the effectiveness of ketamine pretreatment in reducing the occurrence of pain on propofol intravenous injection.

Methods: This randomized, prospective clinical type of study was conducted in the department of Anaesthesiology at Bangladesh Medical College Hospital, Dhanmondi, Dhaka from 7th February 2025 to 6th August 2025. One hundred eight (108) American Society of Anaesthesiologist (ASA) grade-I & II patient schedule for different surgical procedures under general anaesthesia were included in this study. Patients were randomly divided into two groups. Group-A (n=54) received 0.2mg/kg ketamine pretreatment and Group-B (n= 54) received 0.9% normal saline 2ml intravenously as placebo before propofol injection. The venous drainage was occluded manually at mid arm after the injection. One fourth of the total calculated induction dose of propofol was administered over a period of five seconds. The patients were asked about the pain on injection. The verbal response and the behavioral signs, such as facial grimacing, arm withdrawal or tear

were noted. A score of 0-3 which corresponds to no, mild, moderate and severe pain was recorded.

Results: Pain complained after propofol intravenous injection was less in the ketamine group ($p<0.001$).

Conclusion: Ketamine pretreatment is effective in reducing the occurrence of pain on propofol intravenous injection.

Key Words: propofol, injection ketamine, intravenous route

Introduction:

Propofol is a popular induction agent, especially for short cases, day care surgeries and when a laryngeal mask is to be used. It produces a good quality of anaesthesia and rapid recovery. However, it often has the disadvantage of causing pain or discomfort on injection. The experience of pain upon the injection of propofol has been widely investigated and is reported to occur in 70%² of patients without any other pretreatment. In children the incidence of pain is even more and found to be around 80%³.

Many different methods have been used to alleviate this pain including use of larger veins^{4,5,6,7}, decreasing speed of injection, injection of drug into a fast intravenous fluid^{7,2,1}, diluting it with 5% glucose or 10% intralipid⁶, mixing lidocaine with propofol⁸, venous occlusion²², pretreating with alfentanil^{14,23}, meperidine, cooling to 4 degree celcius, injecting cold saline 4% before propofol injection^{24,25} and preparation of skin with nitroglycerine ointment¹⁷.

Most of the drugs studied for use as pretreatment in reducing propofol injection pain did not offer any satisfactory result. So we decided to study with ketamine.

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