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# Effect of Intravenous Ketamine Administration on the Incidence of Delirium after Coronary Artery Bypass Graft Surgery: A Triple-Blind Randomized Clinical Trial

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## ABSTRACT

**Introduction:** Delirium is a consciousness and cognitive disorder which occurs primarily in the postoperative period. The incidence of delirium after open heart surgery has been reported to be more than 90%. Delirium can delay the discharge of patients admitted to the intensive care unit (ICU). Ketamine is a psychoactive drug with unique properties. The present study was conducted to determine the effect of intravenous ketamine during induction of anesthesia on the incidence of delirium in patients undergoing coronary artery bypass surgery.

**Methods and Materials:** This study is a randomized, triple-blind, placebo-controlled trial with a statistical population of 60 candidates for coronary artery bypass graft surgery at Hazrat Rasool Akram's Education and Treatment Center. Patients were divided into two groups of 30 individuals, with one group receiving ketamine and the other receiving a placebo, using a random block sampling method. The research team prepared and coded the drug regimens in envelopes, randomized them, and distributed them to trained anesthesiologists for blind administration. The anesthesia method was consistent for all patients involved in the study, with the exception that, immediately following the induction of anesthesia, ketamine was administered to the ketamine group, while 0.9% normal saline was given to the placebo group. After surgery, the incidence of delirium was assessed in the ICU using the ICDSC tool during the first 24 and 48 hours of admission, conducted by an individual who was unaware of the interventions. The results were analyzed using descriptive and inferential statistics in SPSS 23 statistical software.

**Results:** Eligible participants were randomly divided to receive ketamine or placebo. The intervention group received intravenous ketamine immediately after anesthesia induction, and the control group received saline solution as a placebo. The results of this study showed that the incidence of postoperative delirium was significantly lower in the ketamine group (2%) compared to the placebo group (35%), with a $p$ value =0.01, as determined by Fisher's exact test. Based on logistic regression analysis, the odds of postoperative delirium in placebo-treated patients compared with ketamine-treated patients were significantly higher, with an odds ratio of 11.6 (95% CI: 1.5-107.5).

**Conclusion and Discussion:** Ketamine's anti-inflammatory properties significantly reduce postoperative delirium in cardiac surgery patients undergoing cardiopulmonary bypass. Based on previous studies that show ketamine's anti-inflammatory properties, our findings also support its effectiveness in reducing the incidence of delirium. This finding helps to optimize postoperative management strategies and emphasizes the importance of considering ketamine as part of a comprehensive approach to reducing postoperative complications and improving patient outcomes.

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