INPLASY

Efficacy and Safety of Remimazolam in Cardiac Surgery: A Systematic Review and Meta - Analysis

INPLASY202540005

doi: 10.37766/inplasy2025.4.0005

Received: 2 April 2025

Published: 2 April 2025

Fei, SQ; Zhang, XJ; Huang, CH; Li, YN.

Corresponding author:
Yongnan Li

lyngyq2006@foxmail.com

Author Affiliation:
Lanzhou University Second Hospital.

ADMINISTRATIVE INFORMATION

Support - General Projects of the Joint Research Fund(23JRRA1502).

Review Stage at time of this submission - Piloting of the study selection process.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202540005

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 2 April 2025 and was last updated on 2 April 2025.

INTRODUCTION

Review question / Objective This meta-analysis aims to evaluate the efficacy of remimazolam in patients undergoing cardiac surgery, including its impacts on hemodynamics, the incidence of perioperative adverse events, clinically relevant complications, and so on. Ultimately, this systematic review and meta-analysis aims to provide evidence-based guidance for clinicians when choosing anesthesia for patients undergoing cardiac surgery, and to inform future research and clinical practice guidelines.

Rationale Cardiac surgery is a high - risk procedure where anesthetic choice is crucial. Remimazolam, a novel short - acting benzodiazepine, shows potential advantages like rapid onset and offset. Existing research on its use in cardiac surgery is fragmented.Despite limited availability of data, which to date consist mostly of observational analyses and a few randomized controlled trials, remimazolam has shown some potential benefit over other intravenous anesthetics in select cardiac surgical patients, warranting further exploration. A systematic synthesis and meta-analysis of available observational studies is therefore necessary to clarify remimazolam's efficacy in cardiac surgery, guiding clinicians on whether to adopt remimazolam. It will provide evidence for further research and improve clinical practice in cardiac surgical anesthesia.

Condition being studied Cardiac surgery is a high - risk procedure where anesthetic choice is crucial. Remimazolam, a novel short - acting benzodiazepine, shows potential advantages like rapid onset and offset. Existing research on its use in cardiac surgery is fragmented.Despite limited availability of data, which to date consist mostly of observational analyses and a few randomized controlled trials, remimazolam has shown some potential benefit over other intravenous anesthetics in select cardiac surgical patients, warranting further exploration.

METHODS

Participant or population Studies on the use of remimazolam for anesthesia in cardiac surgery of adult patients and reporting detailed relevant clinical parameters were identified and included.

Intervention Remimazolam.

Comparator Conventional anesthesia without the use of remimazolam.

Study designs to be included Unlimited.

Eligibility criteria Studies were included in the systematic review and meta-analysis if they (1) assessed the impact of remimazolam in adult patients undergoing cardiac surgery and (2) recorded patient clinical snd treatment characteristics such as hemodynamic parameters, inflammatory stress response indices, respiratory function indices, perioperative indices and adverse reactions in the two groups.Exclusion criteria included (1) published abstract without full-text publication and (2) studies lacking endpoint measures.

Information sources Pubmed, Embase, the Cochrane Library and the International Clinical Trails Registry platform databases.

Main outcome(s) Efficacy of anesthesia induction, quality of anesthesia maintenance, recoveryfrom anesthesia and hemodynamic parameters.

Additional outcome(s) The incidence of perioperative adverse events, clinically relevant complications, degree of postoperatove pain and postoperative recovery.

Quality assessment / Risk of bias analysis Risk of bias will be assessed using: Newcastle-Ottawa. Data will be assessed independently by at least two people (or person/machine combination) with a process to resolve differences.Additional information will be sought from study investigators if required information is unclear or unavailable in the study publications/reports.

Strategy of data synthesis Continuous variables were reported as means (± standard deviation) or medians (interquartile range). Categorical variables were presented as counts and percentages (%). Statistical analyses were performed using R 4.4.2 software. Summary effects were calculated and presented with 95% confidence intervals (CIs). The risk ratio (RR) was used as the summary statistic for dichotomous data.Heterogeneity was assessed using the Cochrane Q test (chi-squared test) and the I^2 statistic, which quantify the proportion of total variation across studies attributable to heterogeneity rather than chance. A P-value less than 0.1 for the Cochran Q test or an I^2 value greater than 50% indicated significant heterogeneity. In the presence of significant heterogeneity, a random-effects model was employed; otherwise, a fixed-effects model was used.For meta-analyses involving 10 or more studies, a funnel plot with 95% confidence intervals was generated to assess publication bias. A P-value less than 0.05 was considered statistically significant.

Subgroup analysis None planned.

Sensitivity analysis The Cochrane Q statistic was calculated and used to evaluate the heterogeneity among the included studies for each outcome of interest. The I^2 statistic will be used in conjunction, where values between 25% and 50% will signify low heterogeneity, 51% - 75% moderate heterogeneity, and over 75% high heterogeneity.An exclusion sensitivity analysis was performed when necessary and a 2-sided P value of <0 .05 was considered statistically significant for all analyses.

Country(ies) involved China.

Keywords Remimazolam, Cardiac Surgery, Hemodynamics.

Contributions of each author

Author 1 - Shiqi Fei.
Email: m17604337939@163.com
Author 2 - Chuhan Huang.
Email: 320220920890@lzu.edu.cn
Author 3 - Xiaoqian Zhang.
Email: z15729382456@163.com
Author 4 - Shilin Wei.
Email: weishilinv@qq.com