INPLASY

The effect of intravenous lidocaine before intubation on induction period of anesthesia: A systematic review and meta-analysis

INPLASY202460057

doi: 10.37766/inplasy2024.6.0057

Received: 16 June 2024

Published: 16 June 2024

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - The authors declare that there are no financial conflicts of interest during the study or in the writing of the paper that could affect the objectivity and impartiality of the results of the study.At the same time, the authors found no other factors that might constitute a conflict of interest.

INPLASY registration number: INPLASY202460057

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 16 June 2024 and was last updated on 16 June 2024.

INTRODUCTION

Review question / Objective (1)What is the effect of administering intravenous lidocaine before intubation on induction period of anesthesia? (2) What dose of lidocaine is safe for intravenous administration? (3) Is there heterogeneity in studies on the efficacy and safety of intravenous lidocaine? If there is heterogeneity, what causes it? Do these reasons influence the conclusions of the meta-analysis? Are the conclusions of the meta-analysis robust, i.e. can they withstand further research and validation?

Condition being studied Endotracheal intubation during induction of general anaesthesia can cause a temporary significant hemodynamic respo. It leads to an increase in heart rate, blood pressure, arrhythmias, coughing, bronchospasm, intracranial pressure and intraocular pressure. It could be potentially harmful, and increases the risk of cardiovascular events, especially in elderly patients or patients with cardiovascular diseases.The induction drugs for general anesthesia may have certain adverse effects.The likes of pain from injection with propofol or rocuronium bromide and coughing caused by opioids.

METHODS

Participant or population All patients who was operated under general anesthesia with endotracheal intubation, those received intravenous lidocaine before intubation of endotracheal tube, irrespective of sociodemographic and geographic boundaries.

Intervention Received intravenous lidocaine infused.

Comparator Received the same amount of saline or were left untreated.

Study designs to be included Randomized controlled trials.

Eligibility criteria Inclusion criteria
1.RCTs
2.Participants:Adult patients undergoing tracheal intubation and general anesthesia
3.Intervention: intravenous lidocaine before intubation
4.Comparison:received the same amount of saline or were left untreated.
5.Outcomes:Studies reporting at least one of the following outcomes: blood pressure (before and after intubation), Adverse event (coughing after anesthesia induction, injection pain, cardiovascular accident), blood catecholamine levels(before and after intubation),intracranial pressure, intraocular pressure
Exclusion criteria
1.The type of study was not specified
2.No valid data could be extracted from the text
3.Republished article
4.The full article is not available
5.The sample size is too small.

Information sources The accuracy and breadth of the information sources is essential to ensure the reliability and comprehensiveness of the analysis results. Here is a detailed description of the source of the information:
1. Electronic database search
This study mainly obtains relevant research literature through electronic database search. We used authoritative databases in the medical field such as PubMed, Cochrane Library, Web of Science, etc. These databases contain a large number of medical research results from around the world, we were able to find published literature relevant to this study in these databases.
2.Contact with the author
During the search, we may find some unpublished research or ongoing research. In order to obtain detailed information about these studies, we tried to contact the authors.
3.Test registration platform
4.Grey literature retrieval.

Main outcome(s)
1.Blood pressure, heart rate before and after induction.
2.Cough after opioid administration.
3.Injection pain.
4.Dose-dependent lidocaine.

Additional outcome(s) Arrhythmias, bronchospasm, blood catecholamine concentration, toxic reaction to lidocaine.

Quality assessment / Risk of bias analysis The outcome of the studies will be assessed. We used the Cochrane bias assessment tool to evaluate the following domains: Random sequence allocation, allocation concealment, blinding of participants and personnel, blinding of outcome assessors, incomplete outcome data, selective outcome, reporting, and other potential threats to validity. Funnel plots will be used to assess for publication bias in outcomes where more than 10 studies are available.

Strategy of data synthesis Data will be synthesised if minimum two studies were eligible. Data of blood pressure and heart rate before and after tracheal intubation will be synthesised. Review Manager is going to be used for data management.For continuous variables, we will calculate the mean difference(MD) and 95% confidence intervals (Cls) by the method of inverse variance. For dichotomous variables, we will calculate the risk ratio (RR) and 95% Cls based on the method of Mantel-Haenszel. Collected studies will be assessed for heterogeneity using the I^2 statistic. 1^2 greater than 50% will be regareded as considerable heterogenity, and data will be analyzed using the Mantel-Haenszel random effect model. Otherwise, we will apply the Mantel-Haenszel fixed effect model.

Subgroup analysis Subgroup analyses will be carried out for dose of lidocaine and countries, if possible.

Sensitivity analysis One by one exclusion method:Individual studies were excluded one by one, and the changes in meta-analysis results after exclusion were observed. If the results change significantly after excluding a study, it indicates that the study has a large impact on the overall results, which may be a potential source of heterogeneity or bias.
Change the statistical model: Compare the difference between the results under the fixed effects model and the random effects model.If the results of the two models are consistent, the results are robust. If the difference is significant, the reasons need to be further explored.

Language restriction English.

Country(ies) involved China.

Other relevant information None.

Keywords Intravenous lidocaine; Tracheal intubation and general anesthesia;Induction of anesthesia; Efficacy;Systematic review ; Meta-analysis.

Contributions of each author

Author 1 - Junjun Qin - The author drafted the manuscript.
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Author 2 - Zhengwei Chen - The author provided statistical expertise.
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Author 3 - Sijun Yan - The author contributed to the risk of bias assessment strategy.