International Platform of Registered Systematic Review and Meta-analysis Protocols

INPLASY

Impact of Postoperative Changes in Cardiovascular Metrics on Adverse Clinical Outcomes in Patients That Underwent Major Non-Cardiac Surgery: A Scoping Review

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ADMINISTRATIVE INFORMATION

Support - No financial support.

Review Stage at time of this submission - The review has not yet started.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 16 December 2025 and was last updated on 16 December 2025.

INTRODUCTION

Review question / Objective Are there any association(s) among postoperative changes in cardiovascular metrics (heart rate and blood pressure) and adverse clinical outcomes in adults undergoing major non-cardiac surgery?
Objectives:
1) Identifying published studies assessing changes in cardiovascular metrics such as heart rate and blood pressure within 72 hours after major non-cardiac surgery in adults.
2) Describing how heart rate and blood pressure changes have been measured and defined in postoperative settings (measurement techniques, time windows, definitions of variability, etc.)
3) Mapping the range of adverse clinical outcomes reported (e.g., mortality within 30 days, myocardial infarction (MI), acute kidney injury (AKI), infection, stroke, reoperation, disability, length of stay, or as reported by individual papers).
4) Highlighting gaps in knowledge and methodological variability to inform future systematic reviews or interventional studies.

Background Cardiovascular metrics like heart rate and blood pressure are markers of autonomic regulation that have been associated with mortality and cardiovascular risk in a variety of patient populations. Within the perioperative literature, most studies focus on the intraoperative period between intubation and extubation. However, the postoperative period, a time characterized by hemodynamic instability, fluctuating autonomic tone, and heightened vulnerability to complications, has received far less attention. The early recovery phase (within 72 hours of surgery) represents a critical window of autonomic instability, where subtle to significant alterations in heart rate or blood pressure may influence adverse outcomes.

Rationale We are interested in mapping the existing evidence on postoperative changes in

cardiovascular metrics such as heart rate (including heart rate variability (HRV), tachycardia, bradycardia, etc.) and blood pressure (including blood pressure variability (BPV), hypertension, hypotension, etc.) within 72 hours after major non-cardiac surgery, describing how these cardiovascular metrics have been measured and how they relate to postoperative complications and adverse clinical outcomes such as mortality within 30 days, myocardial infarction (MI), acute kidney injury (AKI), infection, stroke, reoperation, or as reported by individual papers.

METHODS

Strategy of data synthesis We will search PubMed, MEDLINE, Embase, CINAHL, Scopus, and Web of Science with no timeline or date restrictions. Our search strategies will combine controlled vocabulary and free-text terms related to changes in heart rate (e.g. "heart rate variability", "tachycardia", "bradycardia", etc.), changes in blood pressure (e.g. "blood pressure variability", "hypertension", "hypotension", etc.), and adverse clinical outcomes (e.g. "serious adverse event", "mortality", "infection", etc.). Searches will be limited to human studies but not restricted by language; Google Translate or other comparable machine translation tools will be used for screening non-English publications. The reference lists of included studies will be reviewed to identify additional articles that can be included.

Eligibility criteria Types of participants (Population): Adults (≥18 years) who have undergone major non-cardiac surgical procedures in any clinical or research setting.

Concept: Changes in cardiovascular metrics such as heart rate (including heart rate variability (HRV), tachycardia, bradycardia, relative or absolute changes from baseline, etc.) and blood pressure (including blood pressure variability (BPV), hypertension, hypotension, relative or absolute changes from baseline, etc.)

Context: Postoperative period (up to 72 hours after surgery) in any healthcare setting; all adverse clinical outcomes (e.g., mortality within 30 days, MI, AKI, infection, stroke, reoperation, etc.)

Source of evidence screening and selection Study Selection Process: Covidence will be used for research publication screening and management. The selection process will follow a 2-phase approach based on the PRISMA-ScR methodology.

1) Phase 1 (Title and Abstact Screening): Two independent reviewers will screen the titles and abstracts of identified sources to determine eligibility based on the inclusion and exclusion criteria.
2) Phase 2 (Full Text Screening): Two independent reviewers will screen the full-text article of sources that pass the first phase of screening to determine eligibility based on the inclusion and exclusion criteria.
3) Disagreements between the two independent reviewers in either phase 1 or phase 2 of screening will be resolved through discussion until a consensus is reached; if no consensus is reached, a third independent reviewer will resolve the disagreement.

Data management Relevant data (e.g. population, measurements of cardiovascular metrics, key outcomes, etc.) from included studies will be extracted using a pre-designed and standardized data extraction form that will be developed in Microsoft Excel or Google Sheets.

Reporting results / Analysis of the evidence Data will be summarized descriptively with tables, charts, evidence maps, etc. In accordance with JBI methodology and PRISMA-ScR guidelines, no meta-analysis or formal risk-of-bias assessment will be conducted, as the objective is to map existing evidence rather than evaluate study quality or effect estimates.

Presentation of the results Results will be presented using structured tables, graphs, and figures along with accompanying narrative text to discuss and provide context for the findings and implications of this study.

Language restriction No language restrictions will be applied during the search. Studies published in languages other than English will be screened using Google Translate or comparable machine translation tools to determine eligibility.

Country(ies) involved United States.

Other relevant information This study will be a scoping review following the Joanna Briggs Institute (JBI) framework and reported in accordance with the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews) checklist.

Keywords heart rate variability (HRV); tachycardia; bradycardia; blood pressure variability (BPV); hypertension; hypotension; adverse clinical outcome; major non-cardiac surgery.

Dissemination plans We plan to submit the completed scoping review for publication in a peer-reviewed anesthesiology journal, and findings will be presented at relevant local, regional, and national research conferences.

Contributions of each author

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