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Incidence and related factors of post-induction hypotension in patients undergoing general anesthesia: a systematic review and meta-analysis

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ADMINISTRATIVE INFORMATION

Support - Nursing Department Fund of Shanghai Ninth People's Hospital.

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 8 April 2026 and was last updated on 8 April 2026.

INTRODUCTION

Review question / Objective Incidence and related factors of post-induction hypotension in patients undergoing general anesthesia: a systematic review and meta-analysis.

Rationale Induction of general anesthesia frequently leads to hypotension, which is associated with adverse outcomes including myocardial injury, acute kidney injury, and increased mortality. Understanding the true incidence and identifying risk factors is crucial for prevention and management strategies.

Condition being studied Post-induction hypotension — defined as a decrease in systolic blood pressure to 20-30% from baseline, or mean arterial pressure <65 mmHg, depending on original study definitions.

METHODS

Search strategy The search strategy will combine terms related to (“general anesthesia” OR “induction of anesthesia”) AND (“hypotension” OR “low blood pressure” OR “hemodynamic instability”) AND (“incidence” OR “prevalence” OR “risk factors”). Both English and Chinese databases will be searched.

Participant or population Adult patients (≥18 years) undergoing surgery under general anesthesia, without restriction on surgical type or comorbidities.

Intervention General anesthesia induction with any standard agents (propofol, etomidate, thiopental, sevoflurane, etc.).

Comparator Not applicable for incidence studies; for risk factor analysis, patients with vs. without hypotension.

Study designs to be included Observational studies (cross-sectional, prospective/retrospective cohort) and baseline data from RCTs that report the incidence of hypotension during anesthesia induction.

Eligibility criteria Population: Adult patients (≥ 18 years) undergoing elective surgery under general anesthesia

Context: Hypotension occurring during the induction period (defined as from anesthesia induction to surgical incision, or within several minutes after induction)

Outcomes: Primary outcome is the incidence of induction-induced hypotension; secondary outcomes include associated factors (e.g., age, ASA classification, baseline blood pressure, induction agents, dosage)

Study types: Cross-sectional studies, cohort studies, or randomized controlled trials reporting incidence data.

Information sources PubMed, EMBASE, Cochrane Library, Web of Science.

Main outcome(s) Primary outcome is the incidence of post-induction hypotension.

Additional outcome(s) Secondary outcomes include associated factors (e.g., age, ASA classification, baseline blood pressure, induction agents, dosage).

Data management All analyses will be conducted using R software (meta package) or Stata.

Quality assessment / Risk of bias analysis Both reviewers independently assessed study quality using the Newcastle-Ottawa Scale (NOS). The NOS evaluates studies across selection, comparability, and outcome domains, with scores ranging from 0 to 9 stars. The inter-rater reliability for the NOS total score, calculated using the intraclass correlation coefficient, was 0.85, indicating excellent agreement. Discrepancies during data extraction or quality assessment were resolved through consultation with a third reviewer, who referred to the original publications to ensure accuracy and consistency.

Strategy of data synthesis Pooled incidence rates with 95% confidence intervals will be calculated using a random-effects model (DerSimonian-Laird method). Heterogeneity will be assessed using I^2 statistic ($I^2 > 50\%$ indicating substantial heterogeneity). Subgroup analyses will explore sources of heterogeneity. Meta-regression may be performed if sufficient data are available.

Subgroup analysis Different definitions of hypotension

Types of induction agents

Patient age groups (<60 vs. ≥ 60 years)

ASA status (I-II vs. III-IV)

Surgical urgency (elective vs. emergency, if reported).

Sensitivity analysis Excluding studies with high risk of bias; excluding small-sample studies.

Language restriction English.

Country(ies) involved China.

Keywords General anesthesia; anesthesia induction; hypotension; incidence; risk factors; systematic review; meta-analysis.

Contributions of each author

Author 1 - Lu Meng - Research design, project management, final writing.

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