

INPLASY PROTOCOL

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We have no conflicts of interest.

Risk factors for acute kidney injury after surgery of type A acute aortic dissection: a meta-analysis

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Review question / Objective: The aim of this meta-analysis of case-control studies is to evaluate the risk factors for acute kidney injury after surgery of Type A acute aortic dissection.

Condition being studied: Type A acute aortic dissection (TAAAD) is a critical condition in cardiovascular surgery with a poor prognosis. Despite the continuous improvement of surgical techniques and medical management, the complication rates and mortality after TAAAD surgery remain high. Acute kidney injury (AKI) is one of the common complications, with an incidence of 18-67%, higher than other heart surgeries. Postoperative AKI of TAAAD is an independent risk factor for in-hospital mortality and adverse events of major cardiovascular and cerebrovascular, and also increases the short-term mortality and long-term mortality of patients. In addition to renal replacement therapy, there is no effective treatment for AKI. Therefore, early identification of risk factors for AKI after TAAAD surgery and targeted perioperative intervention management are of great significance for reducing the incidence of AKI and improving the prognosis of patients. At present, there have been studies on the risk factors for AKI after TAAAD surgery, but studies are not extensive enough and lack of multicentric data, and there are inconsistencies among the results. Therefore, the purpose of this study was to comprehensively investigate the risk factors for AKI after TAAAD surgery.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 26 June 2020 and was last updated on 26 June 2020 (registration number INPLASY202060100).

INTRODUCTION

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remain high. Acute kidney injury (AKI) is one of the common complications, with an incidence of 18-67%, higher than other heart surgeries. Postoperative AKI of TAAAD is an independent risk factor for in-hospital mortality and adverse events of major cardiovascular and cerebrovascular, and also increases the short-term mortality and long-term mortality of patients. In addition to renal replacement therapy, there is no effective treatment for AKI. Therefore, early identification of risk factors for AKI after TAAAD surgery and targeted perioperative intervention management are of great significance for reducing the incidence of AKI and improving the prognosis of patients. At present, there have been studies on the risk factors for AKI after TAAAD surgery, but studies are not extensive enough and lack of multicentric data, and there are inconsistencies among the results. Therefore, the purpose of this study was to comprehensively investigate the risk factors for AKI after TAAAD surgery.

METHODS

Search strategy: Studies on risk factors for AKI after TAAAD surgery were searched from PubMed, Embase, Cochrane library and Web of science from January 2000 to June 2020. The search keywords were "Aneurysm, Dissecting" AND "Acute Kidney Injury" AND "Risk Factors". The search strategy was combined with subject words and free words. At the same time, references of the included studies were manually searched to identify potential references that met the inclusion criteria.

Participant or population: Patients with TAAAD surgery (diagnosed by CT/ MRI, ultrasound), with age ≥ 18 years.

Intervention: Risk factors for AKI after TAAAD surgery. The multivariate logistic regression analysis was adopted in the original studies, and odds ratios (OR) values and 95% confidence intervals (CI) of the risk factors were provided.

Comparator: Patients with no AKI after TAAAD surgery.

Study designs to be included: Case-control studies of risk factors for AKI after TAAAD surgery are included.

Eligibility criteria: (1) Study type: case-control study of risk factors for AKI after TAAAD surgery; (2) Subjects: Patients with TAAAD surgery (diagnosed by CT/ MRI, ultrasound), with age ≥ 18 years; (3) Research contents: Risk factors for AKI after TAAAD surgery. The definitions of all risk factors were similar. The diagnostic criteria of AKI included three most commonly used criteria, RIFLE (Risk, Injury, Failure, Loss of function, End-stage renal disease), AKIN (Acute Kidney Injury Network) or KDIGO (Kidney Disease Improving Global Outcomes). (4) Outcome indicators: The multivariate logistic regression analysis was adopted in the original studies, and odds ratios (OR) values and 95% confidence intervals (CI) of the risk factors were provided.

Information sources: Studies on risk factors for AKI after TAAAD surgery were searched from PubMed, Embase, Cochrane library and Web of science from January 2000 to June 2020. The search keywords were "Aneurysm, Dissecting" AND "Acute Kidney Injury" AND "Risk Factors". The search strategy was combined with subject words and free words. At the same time, references of the included studies were manually searched to identify potential references that met the inclusion criteria.

Main outcome(s): The OR values and its 95% CI were used as effect indexes for counting data.

Quality assessment / Risk of bias analysis: The Newcastle-Ottawa Scale (NOS) is used to evaluate the study quality, and above 6 stars obtained is of high quality. The funnel plot is used to detect publication bias.

Strategy of data synthesis: RevMan5.3 software was used for statistical analysis. The OR values and its 95% CI were used as effect indexes for counting data. The heterogeneity of the included studies was tested by Q test and I². If I²0.1, suggesting homogeneity among studies, fixed effect

model was used for combination analysis. If $I^2 > 50\%$ or $P < 0.1$, suggesting heterogeneity among studies, random effect model was used for combination analysis, and sensitivity analysis was used to find the source of heterogeneity. The combined OR value and its 95%CI of risk factors were calculated, and $P < 0.05$ was considered statistically significant.

Subgroup analysis: We will not use subgroup analysis.

Sensibility analysis: If there will be heterogeneity among studies, random effect model was used for combination analysis, and sensitivity analysis will be used to find the source of heterogeneity.

Country(ies) involved: China.

Keywords: Type A aortic dissection, acute kidney injury, risk factors, meta-analysis.

Contributions of each author:

Author 1 - Lei Wang - Author 1 drafted the manuscript.

Author 2 - Yi Dong - The author provided statistical expertise.

Author 3 - Xiaochai Lv - The author contributed to the development of the selection criteria, and the risk of bias assessment strategy.

Author 4 - Jianzhi Du - The author contributed to the development of the selection criteria, and the risk of bias assessment strategy.

Author 5 - Yongqiang Qiu - The author contributed to the development of the selection criteria, and the risk of bias assessment strategy.

Author 6 - Xiaofu Dai - The author contributed to the development of the selection criteria, and the risk of bias assessment strategy.

Author 7 - Liangwan Chen - The author read, provided feedback and approved the final manuscript.