Risk Factors for Acute Kidney Injury after Pediatric Cardiac Surgery: A Meta-analysis

Jef Van den Eynde, Boris Delpire, Xander Jacquemyn, Ismat Pardi, Michel Pompeu B.O. Sá, Wouter Oosterlinck

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34% of children undergoing cardiac surgery develop acute kidney injury



INTRODUCTION

Cardiac surgery-associated acute kidney injury (AKI) is associated with increased morbidity and mortality in both adults and children. Although extensive research has been carried out to identify risk factors for AKI in adults, risk factors in pediatric patients are less well known.

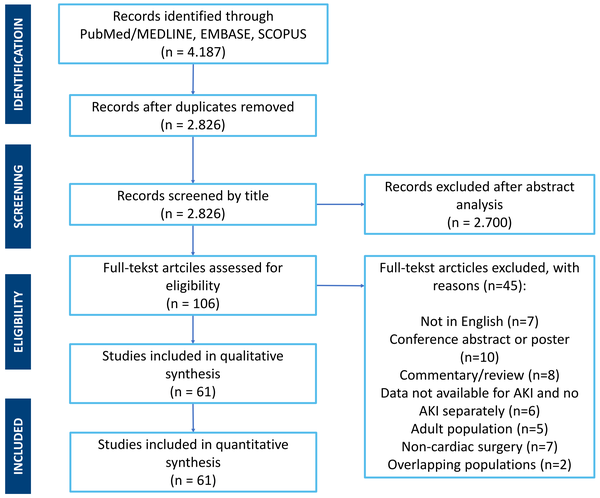
For the implementation of adequate preventive and therapeutic strategies, **it is of great importance to identify the risk factors for AKI in children.**

METHODS

Systemic Review of the literature
- 61 publications
- 19.680 patients

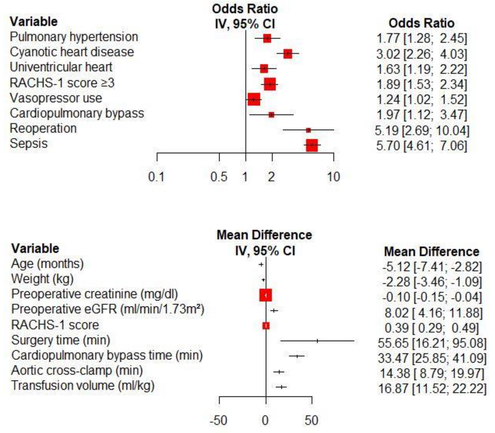
Random-effects meta-analysis

Meta-regression analysis



RESULTS

- **61 publications**
- **19,680 participants:**
  - **AKI:** 7.257 participants
  - **No AKI:** 12.423 participants
- All but one study were nonrandomized observational studies.
- Definitions of AKI (pRIFLE:KDIGO:AKIN): 24:17:11
- **Random effects meta-analysis:**
  - AKI is significantly and consistently associated with **binary** risk factors such as the presence of pulmonary hypertension and CPB
  - AKI is significantly associated with **continuous** risk factors including younger age and weight



Central Figure. Forest plot summarizing main findings.

DISCUSSION

- This meta-analysis identified significant risk factors for the development of AKI after pediatric cardiac surgery
- Risk factors can be subdivided in the following categories: **renal** risk factors, **systemic** risk factors, and risk factors related to **congenital heart disease**
- The results emphasize the need for more standardized AKI definitions based on more sensitive and specific biomarkers than creatinine and adapted to the unique renal physiology in children

CONCLUSION

Further research should aim to **establish protocols** for renal follow-up of patients with CHD, **develop strategies** to effectively prevent AKI, and **investigate biomarkers** for improved diagnosis of AKI.

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