INPLASY

The impact of perioperative infusion of dexmedetomidine on postoperative renal function recovery in kidney transplant recipients: a systematic review and meta-analysis

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ADMINISTRATIVE INFORMATION

Support - No.

Review Stage at time of this submission - Completed but not published.

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 17 July 2023 and was last updated on 17 July 2023.

INTRODUCTION

Review question / Objective P (Population) : Patients undergoing kidney transplant surgery; I (Intervention) : Perioperative infusion of dexmedetomidine; C (Comparison) : Perioperative infusion of normal saline; O (Outcome) : DGF, ARTR, blood creatinine, urine volume, Blood urea nitrogen, Cystatin, glomerular filtration rate; S (Study design) : systematic review and meta-analysis.

Condition being studied End-Stage Renal Disease (ESRD) refers to the end stage of chronic kidney disease caused by various reasons, where the kidneys have progressed to a point where they can no longer maintain normal physiological function. At this stage, the kidneys lose most of their ability to excrete toxins and water, leading to the accumulation of toxins and water in the body, resulting in a series of adverse symptoms and signs. ESRD is one of the significant challenges in the global healthcare field. According to predictions, the number of people receiving Kidney Replacement Therapy (KRT) worldwide is expected to more than double by 2030, reaching 5.4 million, with the fastest growth rate in the Asian region.

METHODS

Participant or population kidney transplant recipients.

Intervention Perioperative infusion of dexmedetomidine.

Comparator Perioperative infusion of normal saline.

Study designs to be included Randomized controlled study and Retrospective study.

Eligibility criteria Inclusion criteria:Include studies that meet the following criteria: (I) The study evaluates the effect of dexmedetomidine on renal function recovery in postoperative renal transplant patients, with no restrictions on study design,(II)

Evaluate the effect of dexmedetomidine on renal function recovery in postoperative renal transplant patients using common renal function indicators (including DGF, ARTR, serum creatinine, urine output, blood urea nitrogen, cystatin C, glomerular filtration rate, etc.),(III) The control group consists of patients who received perioperative infusion of an equal amount of normal saline as a placebo,(IV) Sufficient data to calculate odds ratio (OR) or mean difference (MD) with a 95% confidence interval (CI). Studies with insufficient data are excluded.Exclusion criteria:(I) Duplicate articles,(II) Too few cases,(III) Unavailable full text, incomplete data, data that cannot be converted, or no control group.

Information sources CNKI, VIP, Wanfang, China National Knowledge Infrastructure, Pubmed, Embase, Cochrane, Web Of Science, China Clinical Trial Registry, ClinicalTrials.gov.

Main outcome(s) A total of 7 articles were included in this meta-analysis, including 6 randomized controlled trials and 1 retrospective study, with a total of 1223 patients. Compared with the control group, the experimental group showed no significant statistical differences in ARTR (OR: 0.73, 95% CI: [0.41, 1.30]), postoperative day 1 creatinine (MD: -0.18, 95% CI: [-0.43, 0.08]), postoperative day 3 creatinine (MD: -0.16, 95% CI: [-0.39, 0.07]), postoperative day 5 creatinine (MD: 0.12, 95% CI: [-0.69, 0.93]), postoperative day 6 or 7 creatinine (MD: -0.12, 95% CI: [-0.27, 0.04]), postoperative day 30 creatinine (MD: -0.07, 95% CI: [-0.25, 0.11]), postoperative 3-month creatinine (MD: 0.01, 95% CI: [-0.11, 0.12]), postoperative urea nitrogen (MD: 0.44, 95% CI: [-0.86, 1.74]), postoperative cystatin C (MD: -0.27, 95% CI: [-0.57, 0.03]), and postoperative glomerular filtration rate (MD: -0.07, 95% CI: [-2.48, 2.33]). However, the experimental group showed significant improvements compared to the control group in terms of delayed graft function (OR: 0.71, 95% CI: [0.52, 0.97]), infection (OR: 0.51, 95% CI: [0.33, 0.78]), postoperative day 2 creatinine (MD: -0.21, 95% CI: [-0.37, -0.06]), and length of hospital stay (MD: -0.87, 95% CI: [-1.61, -0.13]).

Quality assessment / Risk of bias analysis The authors used The Cochrane Collaboration's tool to evaluate the risk of bias in RCTs (randomized controlled trials) from 6 domains (selection bias, performance bias, detection bias, attrition bias, reporting bias, other biases). Each criterion was judged "low bias," "unclear," or "high bias" . In addition, the quality of the included case-control studies was assessed using the Newcastle-Ottawa Scale (NOS) from 3 aspects (including comparability of the study population, exposure assessment, and outcome assessment). A total score of 7-9 points indicates high quality, 4-6 points indicates moderate quality, and 1-3 points indicates low quality.

Strategy of data synthesis For binary variables, the authors used a random-effects model, selected the risk ratio (RR) as the effect size, and calculated the 95% confidence interval (95% CI). For continuous variables, the authors conducted subgroup analysis on the same type of data according to the data collection time, using a random-effects model, using the mean difference (MD) as the effect size, and calculating the 95% CI. The authors used the I-square and Chi-square tests to assess heterogeneity; the Chi-square test determined the presence of significant heterogeneity, while the I-square test determined the magnitude of heterogeneity. According to the Cochrane Handbook, significant heterogeneity (for the Chi-square test) is defined as an alpha level below 0.1, while the I-square test is interpreted as follows: (0-40%: not significant; 30-60%: moderate heterogeneity; 50-90%: significant heterogeneity; 75-100%: considerable heterogeneity). All statistical tests for the meta-analysis were performed using Review Manager version 5.4.

Subgroup analysis Subgroup analysis was conducted for postoperative indicators such as blood creatinine, urine volume, blood urea nitrogen, cystatin C, and glomerular filtration rate in chronological order.

Sensitivity analysis The authors conducted sensitivity analysis by sequentially removing each individual study included in the analysis to assess the impact of individual studies on the summary results. The sensitivity analysis showed that the analysis was reliable, and no individual study significantly influenced the summary odds ratio (OR) and summary mean difference (MD) of the main trial results.

Country(ies) involved United States, China.

Keywords Renal transplantation, dexmedetomidine, renal function, Meta analysis, delayed recovery of transplanted renal function, acute renal Transplant rejection, creatinine, urine volume.

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