INPLASY PROTOCOL

Preemptive analgesia using selective cyclooxygenase-2 inhibitors alleviates postoperative pain in patients undergoing total knee arthroplasty: A meta-analysis of randomized controlled trials

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Review question / Objective: The postoperative pain associated with total knee arthroplasty (TKA) is severe for most patients. The analgesic efficacy and safety of preoperative use of selective cyclooxygenase-2 (COX-2) inhibitors for patients undergoing TKA are unclear. We conducted a systematic review and meta-analysis to assess whether the use of selective COX-2 inhibitors before TKA decreases the postoperative pain intensity.
Condition being studied: The use of selective cyclooxygenase-2 (COX-2) inhibitors for patients undergoing TKA.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 28 September 2020 and was last updated on 28 September 2020 (registration number INPLASY202090101).

INTRODUCTION

Review question / Objective: The postoperative pain associated with total knee arthroplasty (TKA) is severe for most patients. The analgesic efficacy and safety of preoperative use of selective cyclooxygenase-2 (COX-2) inhibitors for patients undergoing TKA are unclear. We conducted a systematic review and meta-analysis to assess whether the use of selective COX-2 inhibitors before TKA decreases the postoperative pain intensity.

Condition being studied: The use of selective cyclooxygenase-2 (COX-2) inhibitors for patients undergoing TKA.

METHODS

Search strategy: The databases of MEDLINE, EMBASE, PubMed, CINAHL, Bandolier, and the Cochrane Controlled Register of Trials were searched from their inception to January 2020 by two of the authors (J.W. and HJ.H.) using the following keywords: "TKA," "TKR," "total knee replacement," "total knee arthroplasty," and "cyclooxygenase-2." When multiple similar reports were published, the most recent report was used.

Participant or population: Patients undergoing total knee arthroplasty (580).

Intervention: All RCTs in which the intervention treatment was preoperative selective COX-2 versus placebo in patients undergoing TKA and that had at least one of the quantitative outcomes mentioned in the following section of this paper were included. Letters, review articles, case reports, editorials, animal experimental studies, and retrospective studies were excluded.

Comparator: Placebo.

Study designs to be included: RCTs.

Eligibility criteria: All RCTs in which the intervention treatment was preoperative selective COX-2 versus placebo in patients undergoing TKA and that had at least one of the quantitative outcomes mentioned in the following section of this paper were included. Letters, review articles, case reports, editorials, animal experimental studies, and retrospective studies were excluded.

Information sources: MEDLINE, EMBASE, PubMed, CINAHL, Bandolier, and the Cochrane Controlled Register

Main outcome(s): The outcome measures were (1) the visual analog scale (VAS) dynamic pain scores on the first and third days after surgery, (2) the modified numerical pain rating scale (MNPRS) score at 72 hours postoperatively, (3) morphine consumption in the first and second 24 hours postoperatively, and (4) adverse effects (nausea and vomiting).

Quality assessment / Risk of bias analysis: The quality of the RCTs was quantified using the Newcastle–Ottawa quality assessment scale, which consists of three parts: patient selection, comparability of the study groups, and assessment of outcomes. The Newcastle–Ottawa quality assessment score of the six included studies varied from 5 to 7 stars.

Strategy of data synthesis: Review Manager (RevMan for Windows version 5.3; The Nordic Cochrane Centre, The Cochrane Collaboration, Copenhagen, Denmark) was used for the meta-analysis. The weighted mean difference (WMD) and 95% confidence interval (CI) were used to estimate the overall pooled effect for continuous data in each study. The relative risk and 95% CI were used to evaluate the dichotomous data. Statistical heterogeneity between studies was assessed using the chi-square test with $P < 0.10$. If heterogeneity was significant ($P \leq 0.05$), a random-effects model was used. If heterogeneity was not significant ($P > 0.05$), a fixed-effects model was used.

Subgroup analysis: None.

Country(ies) involved: China.

Keywords: selective cyclooxygenase-2 inhibitors, preemptive analgesia, total knee arthroplasty, meta-analysis, pain management, safety.

Contributions of each author:
Author 1 - Congcong Wang - Project administration; Conceptualization; Writing–review & editing.
Author 2 - Hongjuan Fu - Data curation.
Author 3 - Jun Wang - Data curation.
Author 4 - Fujun Huang - Methodology.
Author 5 - Xuejun Cao - Supervision.