INPLASY PROTOCOL

To cite: Lei et al. Comparative efficacy of Robotic-assisted, Navigation-assisted, Patient-specific-instrumentation-assisted, and conventional techniques in Total Knee Arthroplasty: Protocol for a network meta-analysis. Inplasy protocol 202060018. doi: 10.37766/inplasy2020.6.0018

Received: 04 June 2020

Published: 04 June 2020

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Support: **CSTC; SWH**

Review Stage at time of this submission: **Preliminary searches.**

Conflicts of interest:
The authors declare no conflicts of interest.

Comparative efficacy of Robotic-assisted, Navigation-assisted, Patient-specific-instrumentation-assisted, and conventional techniques in Total Knee Arthroplasty: Protocol for a network meta-analysis

Lei, K[1]; Liu, LM[2]; Chen, X[3]; Luo, JM[4]; Feng, Q[5]; Yang, L[6]; Guo, L[7].

Review question / Objective: **To evaluate the efficacy of 4 surgical techniques in total knee arthroplasty(TKA), including Robotic-assisted TKA, Navigation-assisted TKA, Patient-specific-instrumentation-assisted TKA, and conventional TKA.**
Condition being studied: **Total knee replacement is an effective treatment for end-stage knee injuries, but the postoperative dissatisfaction of patients with conventional TKA is as high as 20%. This may be related to lower limb malalignment or malposition of the components. To overcome the limitations of conventional method for TKA, many modified surgical techniques have been adopted, such as Robotic-assisted TKA, Navigation-assisted TKA and Patient-specific-instrumentation-assisted TKA. This network meta-analysis will assess the comparative efficacy of the aboved 4 surgical techniques in TKA.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 04 June 2020 and was last updated on 04 June 2020 (registration number INPLASY202060018).

INTRODUCTION

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METHODS

Search strategy: The search strategy will be constructed in the form of Medical Subject Headings (MeSH) combine with keywords, including "Arthroplasty, Replacement, Knee, Navigation assisted, Robotic assisted, patient specific instrumentation, randomized controlled trial", etc.

Participant or population: Patients have undergone Navigation-assisted or Robotic-assisted or patient-specific-instrumentation-assisted or conventional TKA.

Intervention: The interventions of the experimental group will include 3 surgical techniques in TKA, including Robotic-assisted, Navigation-assisted, Patient-specific-instrumentation-assisted techniques.

Comparator: The control group will include different surgical techniques from the experimental group.

Study designs to be included: Randomized controlled trials.

Eligibility criteria: 1.Any comparison among the four surgical techniques (Robotic-assisted TKA, Navigation-assisted TKA, Patient-specific-instrumentation-assisted TKA and conventional TKA) 2.Studies in the aspect of at least one of the following : perioperative, clinical or radiographic outcomes 3.Studies were randomized controlled trials 4.Patients who underwent primary total knee replacement 5.Studies that were published in English. 6.Studies were excluded if they reported the patients with fracture, deformity, or tumor, and if they were animal or cadaveric studies.

Information sources: The databases searched included The Cochrane Library, PubMed and EMBASE. Studies published in English and from the dates of database inception to June 2020 were included. To ensure that all relevant literatures are included, we also checked the reference lists of systematic reviews published in recent years.

Main outcome(s): Relative radiological results of lower limb alignment or position of the components.

Additional outcome(s): Perioperative, clinical outcomes, such as patient reported scores, pain, range of motion (ROM) and complications,etc.

Data management: Two researchers (KL and LML) will first scan the title and abstract then the full articles will be read when the abstracts lack of the information. The articles will be screened according to the pre-established inclusion and exclusion criteria. Any disagreement will be resolved through discussion, or a third researcher (LG) will appear to resolve the disagreements.

Quality assessment / Risk of bias analysis: Two researchers (KL and LML) will assess the risk of bias independently based on the Cochrane Risk of Bias Tool, including random sequence generation, allocation concealment, blinding of participants and researchers, blinding of outcome evaluator, incomplete outcome data addressed, selective reporting of results, and other risk bias. Finally, all eligible studies will be identified as "high risk of bias", "unclear risk of bias" and "low risk of bias" according to the results of each item evaluation. If there is any disagreement, the two researchers will discuss or a third researcher (LG) will appear to resolve the disagreements.

Strategy of data synthesis: For each outcome, we will carry out a meta-analysis. The OR/RR and MD/SMD with their 95% confidence intervals (95% CI) were produced for binary and continuous outcomes, respectively. When the OR/RR included 1.00 or the MD/SMD included 0.00, the meta-analysis result was deemed not statistically significant. Furthermore, a surface under the cumulative ranking area (SUCRA) curve was used to estimate the ranking probabilities for each intervention, which ranged from 0 to100%. Interventions with larger SUCRA values were considered better interventions. A funnel plot will also depict to estimate the publication bias of outcomes included in more than10 RCTs. The network graph will be displayed as well.

Subgroup analysis: If there is heterogeneity, we will analyze the causes of heterogeneity and conduct subgroup treatment according to different sources of heterogeneity.

Sensibility analysis: We will use the exclusion method to analyze the sensitivity of all outcome indicators. If we find that heterogeneity changes with the exclusion of a certain article, then this article is the source of heterogeneity. It can be analyzed from the aspects of experimental design, sample size, outcome index, evaluation standard and so on. If the heterogeneity remains unchanged, the result is robust.

Language: English.

Country(ies) involved: China.

Keywords: Robotic-assisted; Navigation-assisted; Patient specific instrumentation; Total Knee Arthroplasty; network meta-analysis.

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