INPLASY

Comparing the clinical outcomes of robotic-assisted total hip arthroplasty through the direct anterior approach with conventional total hip arthroplasty: a Meta-analysis and Systematic review

Corresponding author:
Zhoufeng Song

18251878132@qq.com

Author Affiliation:
The First Affiliated Hospital of Zhejiang Chinese Medical University.

Xu, XJ; Zhou, QJ; Song, ZF.

ADMINISTRATIVE INFORMATION

Support - Not applicable.

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

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202440074

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 18 April 2024 and was last updated on 18 April 2024.

INTRODUCTION

*R*eview question / Objective This meta-analysis and systematic review aims to address this gap by synthesizing existing evidence, shedding light on the comparative effectiveness of these surgical methods.

Condition being studied Patients in need of hip replacement.

METHODS

Search strategy ((((((robot[Title/Abstract]) OR (robotic[Title/Abstract])) OR (robotic-assisted[Title/Abstract])) OR (Robot-enhanced[Title/Abstract])) AND (((((((("Arthroplasty, Replacement, Hip"[Mesh]) OR (Hip Replacement Arthroplasties[Title/Abstract])) OR (Hip Prosthesis Implantation[Title/Abstract])) OR (Hip Prosthesis Implantations[Title/Abstract])) OR (Hip Replacement Arthroplasty[Title/Abstract])) OR (Total Hip Replacements[Title/Abstract])) OR (Total Hip Replacement[Title/Abstract])) OR (Total Hip Arthroplasty[Title/Abstract])) OR (Total Hip Arthroplasties[Title/Abstract]))) AND (anterior[Title/Abstract]).

Participant or population Patients in need of hip replacement.

Intervention Robotic assisted total hip arthroplasty (THA) through direct anterior approach.

Comparator 3)Conventional THA (non robotic-assisted THA).

Study designs to be included Cohort study or randomized controlled trials (RCT).

Eligibility criteria The inclusion criteria were as follows: 1) Study object: Patients in need of hip replacement 2)Intervention measures: Robotic assisted total hip arthroplasty (THA) through direct

anterior approach3)Control: Conventional THA (non robotic-assisted THA)4)Outcome indicators: Acetabular inclination, acetabular antevertion, acetabular offset, limb-length discrepancy and Harris hip score.5)Study design: Cohort study or randomized controlled trials (RCT). The language was limited to English and Chinese.Exclusion criteria were duplicate published studies, incomplete studies, incomplete or unavailable data, animal testing, reviews, and systematic reviews.

Information sources PubMed, Embase, Cochrane Library, CNKI, Wanfang, CQVIP and CBM databases.

Main outcome(s) Acetabular inclination, acetabular antevertion, acetabular offset, limb-length discrepancy and Harris hip score.

Quality assessment / Risk of bias analysis Two researchers independently assessed the quality of the studies. RCTs used the Cochrane risk assessment scale to assess literature quality 13, whereas the Newcastle-Ottawa Scale (NOS) was used to evaluate cohort studies 14. Disagreements were addressed through consultation or deliberation by a third party. The meta-analysis was performed according to the reported items and relevant items in the meta-analysis checklist (PRISMA Checklist), which are preferred in system evaluation 15.

Strategy of data synthesis All data were processed with the statistical software STATA 15.1 (StataCorp LLC., College Station, Texas, USA) 16. Standardized Mean Difference (SMD) with 90% confidence interval (CI) was used to analyze continuous variables and odds ratio (OR) with 90% CI was used to analyze categorical variables. A heterogeneity test of $P>0.1$, $I2<50\%$ indicated that all studies were homogeneous and allowed for pooled analysis using a fixed-effects model. $P50\%$ indicated that the studies differed; a difference sensitivity analysis was performed to identify the sources of the difference. If there was still a significant difference, a random-effects model was applied, or a descriptive analysis was conducted instead of the pooled results. Funnel plots and Egger's test were used to investigate publication bias.

Subgroup analysis Not applicable.

Sensitivity analysis We did a sensitivity analysis to exclude each of these trials one by one, and then did a combined analysis of the remaining trials.

Country(ies) involved China (The First Affiliated Hospital of Zhejiang Chinese Medical University).

Keywords Robotic-assisted total hip arthroplasty; Robotic-assisted THA; Direct anterior approach; Clinical outcomes; Meta-analysis and Systematic review.

Contributions of each author
Author 1 - Xiaojun Xu - Author 1 drafted the manuscript.
Author 2 - Qiujun Zhou - The author provided statistical expertise.
Author 3 - Zhoufeng Song - The author contributed to the development of the selection criteria, and the risk of bias assessment strategy.